

Engin.
FEBRUARY 20, 1936

FEB 21 1936

THE IRON AGE

GRANITE CITY STEEL CO.
UNIFORM
HIGH
QUALITY

TIN MILL BLACK PLATE



AVAILABLE
IN MORE THAN
25 DIFFERENT
FINISHES

BETTER SERVICE

TO THE MISSISSIPPI VALLEY • THE WEST • THE SOUTHWEST

GALVANIZED SHEETS, STEEL SHEETS,

SINCE
1878
GRANITE CITY STEEL
GRANITE
CITY
ILLINOIS

PLATES AND TIN PLATE



A SPECIAL PROBLEM *Yesterday-* *Today* AN ALLOY ANALYSIS

Practically every one of the alloy analyses now recognized as standard was originally developed to meet the problem of a consumer who had to have a better steel for a given job. Many of these analyses—notably the S.A.E. 4100, 4600, 4800 and 5100 steels—were first produced in Republic's alloy mills.

Today, as in the early days of the alloy steel industry, Republic is most

anxious to study special conditions and to cooperate with steel users in the development of steels to meet definite requirements. Avail yourself of Republic's knowledge and experience, and the facilities of Republic's Research and Metallurgical Laboratories, the largest in the industry. Let us tell you about the new steels now being developed for industry.

Republic Steel

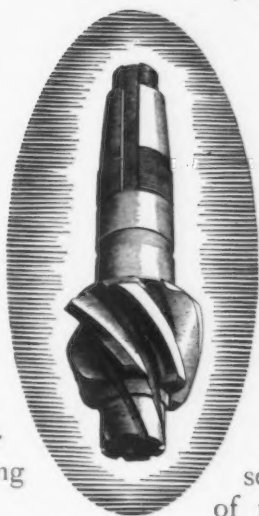
CORPORATION

ALLOY STEEL DIVISION, MASSILLON, OHIO
GENERAL OFFICES: CLEVELAND, OHIO

When writing in reference to this advertisement please address Dept. I.A.



Carburizing Steels



CARBURIZING steels can be of either simple or alloy-steel grade, but are invariably within the low-carbon range. By the carburizing process parts are given a hard, wear-resisting, high-carbon surface, or case, yet retain their tough shock-resisting, low-carbon core. The commonest uses of carburizing steels are for gears, pinions and highly-stressed wearing machinery parts.

To obtain the desired combination of properties in carburized parts, the user has a choice not only of a number of different grades of steel but also of carburizing operations. In each case the service requirements must be balanced against the cost of the steel and also the cost of the treatment.

In general, it can be said of carburizing steels that the cores of carbon steels possess the least ductility, and that, of the alloy steels, the S.A.E. 2515 has the highest combination of core strength and ductility. The fine-grained (A.S.T.M. E1933) alloy steels, such as S.A.E. 3115 and S.A.E. 4615, have become more widely used because they have the property of producing good refinement and minimum distortion with a single quench.

For light parts or where extremely tough cores are required, the carbon content should preferably be 0.18 per cent maximum. For heavy parts with strong cores carbon content should be from 0.15 to 0.25 per cent.

The Society of Automotive Engineers in their

1935 Handbook give recommended treatments for all of the standard grades of carburizing steels, all of which Bethlehem produces.

When the double-quenching method is used, the first temperature is sufficiently high to refine the core and to dissolve the free carbides in the case, and the second temperature is lower for the purpose of refining the high-carbon case and also tempering the low-carbon core. A draw of 250 to 400 degrees Fahrenheit follows the final quenching operation to relieve the strains.

Carburizing materials are either solids, liquids, or gases; the solid materials being most generally used. The rate of carbon penetration depends on the carburizing agent used, the length of time, and the degree of temperature to which the part is exposed during the carburizing operation.

Service requirements determine the final depth of the hardened case. For most parts the carbon penetration must be sufficiently deep to allow for the removal of 0.10 to 0.15 inch of material by subsequent grinding. If the part is of such a shape that unusual warpage is likely to occur, this allowance must be increased.

The case must be sufficiently deep to provide uniform hardening without soft spots and to withstand the required amount of wear in service. Unnecessarily deep cases increase cost and susceptibility to breakage by severe shock.



BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

This *non-skid* floor plate is easy on the feet



—one reason why it's easier to sell

MULTIGRIP floor plate is not only safe. It is comfortable to stand or walk on. It provides good traction for wheels. There are no pockets in which dirt might catch, hence it is easy to sweep clean; and it drains

quickly and completely. Yet, with all its advantages, Multigrip costs no more than other floor plate. These Multigrip advantages give you a big edge on competition. Write for prices and complete information.

MULTIGRIP FLOOR PLATE

Carnegie-Illinois Steel Corporation • Pittsburgh • Chicago

Pacific Coast Distributors

Columbia Steel Company, San Francisco



Export Distributors

United States Steel Products Co., New York

UNITED STATES STEEL

THE IRON AGE

CHESTNUT AND 56TH STREETS, PHILADELPHIA, PA.
Sales Offices
239 WEST 39TH STREET NEW YORK, N. Y.

FRITZ J. FRANK, President

J. H. VAN DEVENTER
Editor

T. H. GERKEN
Managing Editor

A. I. FINDLEY
Editor Emeritus

R. E. MILLER
Machinery Editor

F. J. WINTERS

T. W. LIPPERT

L. M. WAITE

NEIL E. MACMILLAN

L. W. MOFFETT
Washington

R. A. FISKE
Chicago

F. L. PRENTISS
Cleveland

G. EHRLSTROM, JR.
Pittsburgh

FRANK J. OLIVER
Detroit

GERARD FRAZAR
Boston

R. G. MCINTOSH
Cincinnati

Contents—February 20, 1936

Rule by Majority	21
Aluminum—From Element to Industrial Metal	22
Skilled Labor in the Making	28-A
Color as an Aid in Finishing Operations	29
Corrosion, Main Source of Galvanizers Dross	30
Conveyors in Strip Mill Pickling Operations	34
Brazing New Type Tear Gas Shells	37
Acme Uses Modified Laboratory Slab Furnace	38
Developments in Welding of Copper Alloys	40
Coordinated Design Features New Mill	42
New Equipment	46
Automotive Industry	52
Washington News	56
News	66
Rate of Activity in Capital Goods	75
Statistics on Metal-Working Activity	76
Markets	77
Construction and Equipment Buying	98
Products Advertised	118
Index to Advertisers	140

Copyright 1936 by Chilton Company (Inc.)

C. S. BAUR, General Advertising Manager
A. H. DIX, Manager Reader Service

Member, Audit Bureau of Circulations

ADVERTISING STAFF

Member, Associated Business Papers

Emerson Findley, 311 Union Bldg., Cleveland
B. L. Herman, 675 Delaware Ave., Buffalo, N. Y.

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50, including duty; Foreign \$12.00 a year. Single copy, 25 cents.

H. K. Hottenstein, 802 Otis Bldg., Chicago
Peirce Lewis, 7310 Woodward Ave., Detroit
Charles Lundberg, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.

C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
W. C. Sweetser, 239 West 39th St., New York
D. C. Warren, P. O. Box 31, Hartford, Conn.

Cable Address, "Ironage, N. Y."

Owned and Published by



CHILTON COMPANY
(Incorporated)

Executive and Publication Offices.
Chestnut and 56th Sts., Philadelphia, Pa.

C. A. MUSSELMAN, President

FRITZ J. FRANK, Executive Vice-President
FREDERIC C. STEVENS, Vice-President

JOSEPH S. HILDRETH, "

GEORGE H. GRIFFITHS, "

EVERIT B. TERHUNE, "

ERNEST C. HASTINGS, "

WILLIAM A. BARBER, Treasurer

JOHN BLAIR MOFFETT, Secretary



RYERSON FOR MECHANICAL TUBING and ALL OTHER STEEL PRODUCTS

**Immediate
Shipment
Assured**



Thousands of customers depend on Ryerson for quick, accurate shipment of all their steel requirements. We seldom fail them. Stocks, the largest in the country, cover the full range of steel and allied products—all shapes, sizes and kinds.

Complete equipment for quickly cutting, bending and forming, manned by experienced steel-service

crews, together with special dispatching methods assure prompt shipment of every order.

Ten plants are ready to serve you. Call on the one nearest you. Whatever you require, a few bolts, a carload of structurals or special alloy steels, your order will have quick personal attention.

Write for the Ryerson Stock List.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cleveland, Cincinnati, Detroit, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE

▲▲▲ THE IRON AGE ▲▲▲

FEBRUARY 20, 1936

ESTABLISHED 1855

Vol. 137, No. 8

Rule by Majority

IN Russia, Germany and Italy we know, of course, that there is not even a pretense of majority rule. In Russia, approximately 1,500,000 members of the Communist party rule the remaining 147 million of the population who have no voice in the matter. Even so, this is a more democratic showing than is made by Germany and Italy which are both "one man" countries.

Is the United States still a Democracy, in the sense that the majority rules within the Constitutional limits provided for the protection of minorities, or are we veering toward minority rule, in imitation of our overseas neighbors?

Let's make a practical test of this question.

During the past three years the outstanding activities of Federal legislation and administration have been characterized by an unmistakable swing to the left. The Supreme Court has placed a few obstructions in the path of this decided detour but nevertheless the intention to move toward socialization has been unmistakably evident.

Was this tremendously important legislative and administrative change in American policy the result of a majority mandate?

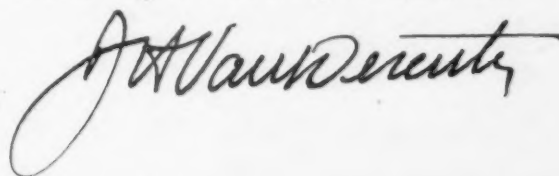
Of the approximately 40,000,000 United States citizens who voted in the last Presidential election, 23,000,000 of them voted for the Democratic candidate, whose mandate was a conservative but constructive platform. Sixteen million voted for the Republican candidate, who ran upon an equally conservative platform.

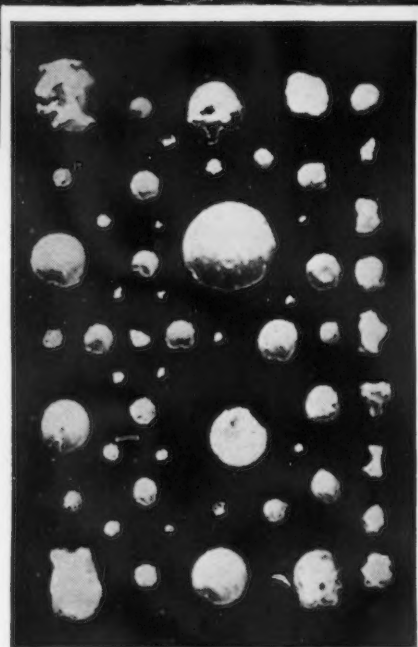
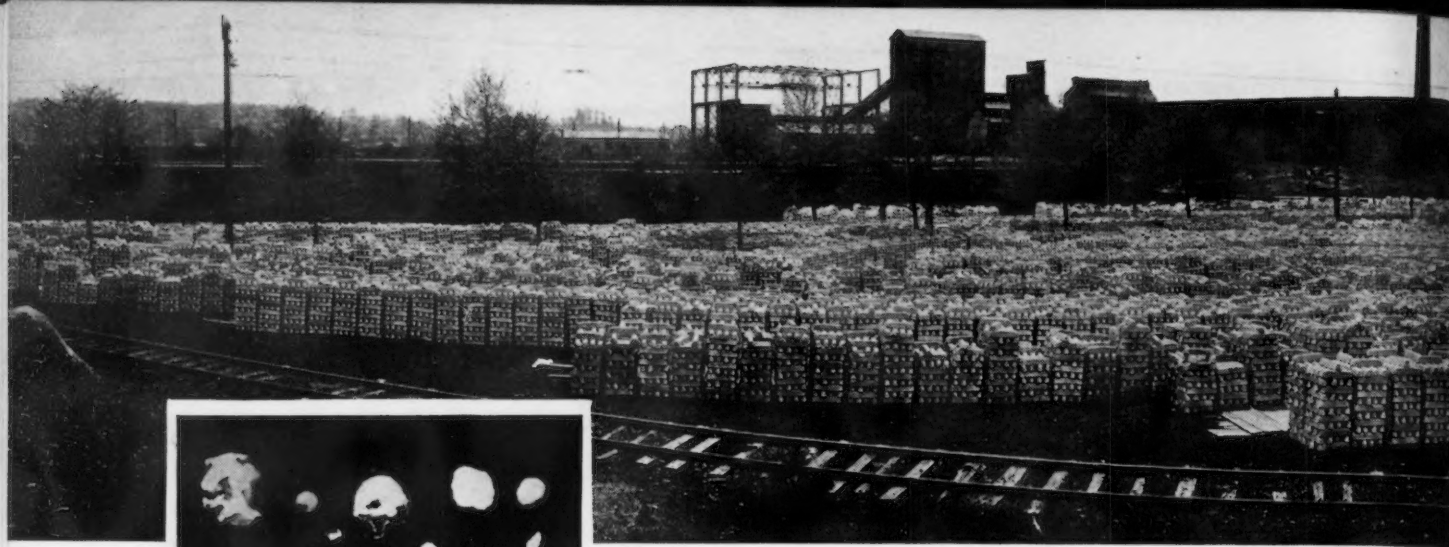
Less than one million of our citizens voted for Mr. Norman Thomas, who stood honestly and openly upon the platform of socialization and a trend to the left.

The American mandate, therefore, was 39 to 1 for budget balancing, less government competition with business, economy and the curtailment of Federal bureaucracy.

Which mandate has been more nearly carried out—that of the majority or that of the minority?

The action of the last Communist International convention, in indorsing the endeavors of our present Administration, should help in answering this question.





ALUMINUM—From

A YOUNG experimenter, fresh from college, worked in his laboratory and gave birth to an enormous industrial enterprise. To the left are shown the original globules of aluminum produced by Hall at a time when the metal was selling for \$8 a lb. The acres of aluminum ingots shown in the panoramic view above constitute the inventory of the Alcoa Works of the Aluminum Co. of America. The current selling price of this Hall process metal is about 20¢ a lb.

o o o



FEBRUARY 23, 1886!

Just one of the three hundred sixty odd thousand days during the nineteenth century, the average person may think. Admittedly it is just one day, but withal a very significant one. For it marked the successful culmination of a long series of trying experiments by Charles Martin Hall on a practical method for making aluminum.

To put the twenty-two-year-old Oberlin College graduate in the proper fame, it will be desirable to consider the history of aluminum in three periods: (1) prior to 1825; (2) 1825 to 1886; and (3) 1886 to 1936.

First to be considered is the period prior to 1825. Although aluminum compounds are literally as "common as dirt" because they comprise an important part of clays and soils, the metallic nature of the base was not suspected until comparatively recent times. In the eighteenth century, the sub-

stance was named "alumina," following Pliny's reference to "alumen" which is currently designated as alum. In 1807, Sir Humphrey Davy tried to reduce the metal and only succeeded in making an alloy with the iron electrodes in his electrical apparatus. However, he was sufficiently convinced that a new metal was imprisoned in the alumina cell to give it the name "aluminium," which he later changed to "aluminum."

The second phase in aluminum's history is that period between 1825 and 1886. There has been much controversy as to whether the German, Wöhler, in 1827, or the Dane, Oersted, in 1825, was the first to produce metallic aluminum. Historians are now in accord that Oersted was the first to achieve this result. He succeeded in reducing aluminum chloride with a potassium amalgam, forming first an aluminum amalgam which he purified by distilling off the mercury.



a Chemical

By ZAY JEFFRIES
Aluminum Co. of America

Element to an Industrial Metal

Wöhler later (1827) made very small amounts of the metal by direct reduction with potassium, but only produced a gray powder. In 1845, his best effort seemed to be the production of pieces weighing about 30 milligrams which could be hammered into thin plates. On these he reported a density measurement of 2.67, which is the first indication to be found in the literature of the extreme lightness of the metal.

It was in 1854 that a Frenchman, Henri St. Claire Deville, made an important improvement in Wöhler's method. He substituted sodium for potassium and found that the reduced globules of aluminum would coalesce in the fused bath of sodium-aluminum chloride. In 1855, Deville exhibited a variety of aluminum products at the Paris Exposition. To him must be given the credit for starting the aluminum industry.

It was not an "industry" as we think of it today. The production

was insignificant and the selling price was more than \$100 per lb. The outlet was mainly for jewelry and ornamental objects. So intriguing were the properties, however, that Emperor Napoleon III of France gave Deville a government subsidy to hasten the development work. The Emperor visualized the strategic value of such a metal for military equipment.

The Deville process held the stage for about thirty-five years, the main improvements being in equipment and in lower cost sodium metal. Because of these improvements and the increased production, the price was gradually reduced from \$100 to about \$8 per lb. Prior to 1886, Deville's plant in France never reached a production exceeding 5000 lb. per year.

Birth of Modern Industry

Aluminum's history between 1886 and 1936 is particularly fascinating. It is difficult, with the modern tempo, to think of an in-

dustry thirty-two years old as either an infant or a weakling, but the aluminum industry of 1886 has been characterized as both. In this year things happened fast. Hamilton Y. Castner, an American, on June 1, 1886, was granted a patent for an improved and cheaper method of producing metallic sodium. He forthwith translated his improvement into the production of cheaper aluminum by using it in Oldbury, England, in the plant of Aluminium Company, Ltd. By 1889 a production of 500 lb. per day was reached, and a total of 250,000 lb. was produced in the three years which ended with 1890.

In the midst of this activity, which had all the earmarks of permanence and fruitfulness, came Charles Martin Hall's invention which snuffed the life out of the Deville-Castner process so quickly that few people now living have even heard about it as a matter of history.

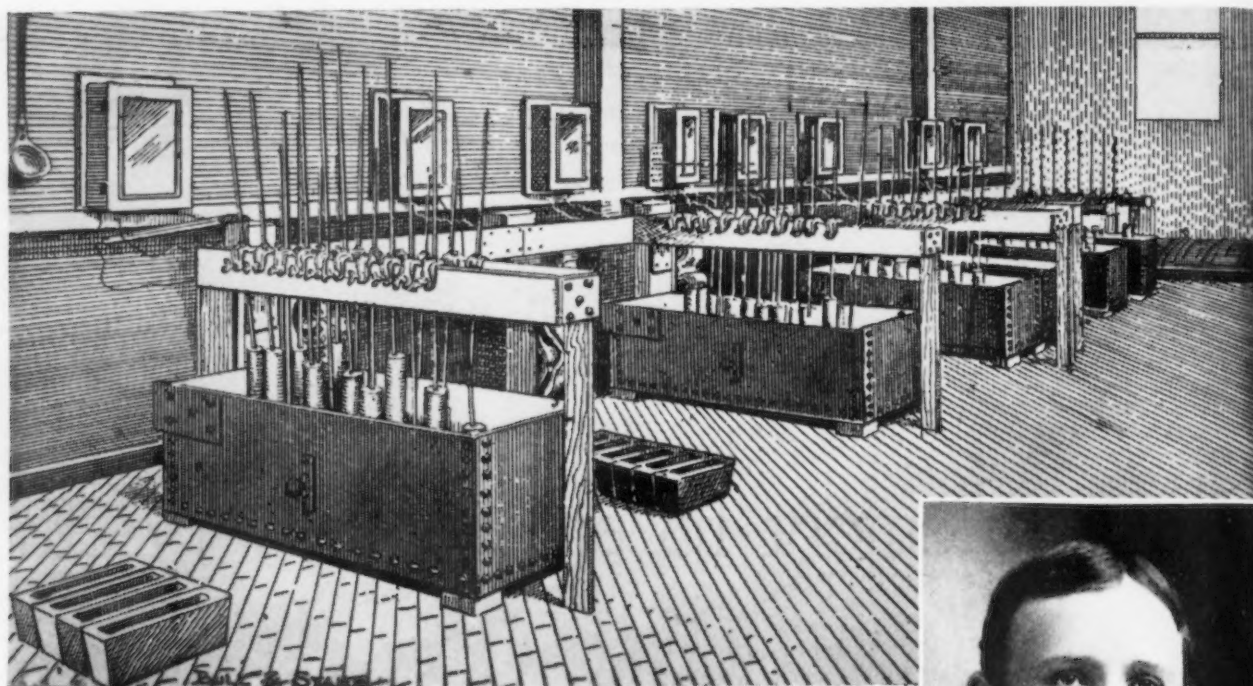
When Hall was a student at

Oberlin, he became very much interested in aluminum and, stimulated by the encouragement and the teaching of the principles of chemistry by Professor Jewett, he staked his all on his ability to find a more practical method for its production. He had graduated in the spring of 1885, but he continued his work at home in the city of Oberlin, receiving such help as he

solution resulted in no metallic aluminum. So confident was he that his theory was correct that he began looking for reasons for the failure. His analysis prompted him in the next experiment to substitute a carbon crucible for the clay one used earlier. We can only imagine his ecstasy when he poured out the crucible contents and found globules of molten aluminum in the

pendent inventors. Hall was granted the United States patent against interference by Heroult, and the commercial application of the Heroult process in Europe came only after Hall's process had reached a successful stage in America.

Lest it be assumed that the problems incident to the commercial production of aluminum were



ABOVE

THE Hall electrolytic cells in the modest plant of the Pittsburgh Reduction Co. on Smallman Street, Pittsburgh. This was the first commercial venture using the Hall process.

o o o

AT RIGHT

CHARLES MARTIN HALL who, on Feb. 23, 1886, when but twenty-two years of age, discovered the electrolytic process for the production of aluminum. This process revolutionized the entire aluminum industry.



could from Professor Jewett and the college.

Among the many things incident to the final outcome, two deserve special mention.

First, he made many unsuccessful attempts. The record shows that each experiment was made with the purpose of gaining a fundamental fact. Each failure became a rung to the Hall Process ladder. He never seemed to be discouraged by these failures, but merely used them to better define his problem.

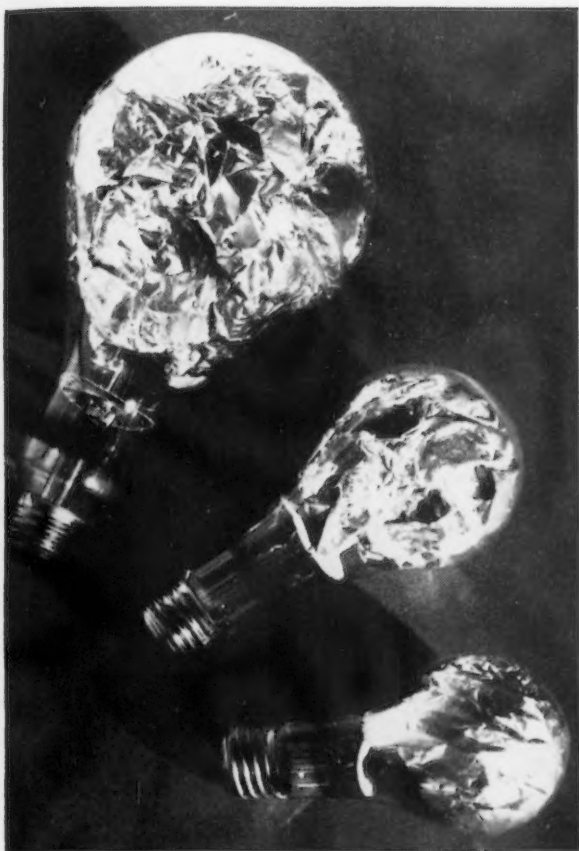
Second, he solved the problem theoretically before he achieved experimental success. He concluded that he must find a solvent for aluminum oxide more stable during passage of an electric current than the dissolved oxide. After several trials, he found that the natural mineral cryolite after melting would dissolve alumina readily at about 1000 deg. C. His first attempt to electrolyze such a "hot"

fused salt bath. He knew he had found the key for the extraction of "gold" from the "clay bank."

Simultaneous Discoveries

Hall obtained his aluminum on Feb. 23, 1886. In passing, it should be recorded that on April 23, 1886, a Frenchman, Paul L. T. Heroult, applied for a French patent on the same process. It now develops that Hall and Heroult were inde-

all solved by Hall's Oberlin experiments, it should be made clear that much remained to be done. Hall needed financial assistance. He first went to Boston, but failed to make a satisfactory connection. Returning to Oberlin, he spent months working on a negotiation which failed to materialize. On July 26, 1887, he made an option arrangement with the Cowles Electric Smelting & Aluminum Co. which



AT LEFT
PHOTO flash bulbs
with their all-im-
portant aluminum
leaf.

o o o

BELOW
A 32-cubic yard
shovel dipper
made possible
through the use of
strong aluminum
alloys.

gave him a chance to try out his ideas on a larger scale. On April 23, 1888, the Cowles Co. gave up the option rather than make the modest payment involved, leaving Hall free to deal with others. He was, however, convinced that his process would produce the expected results.

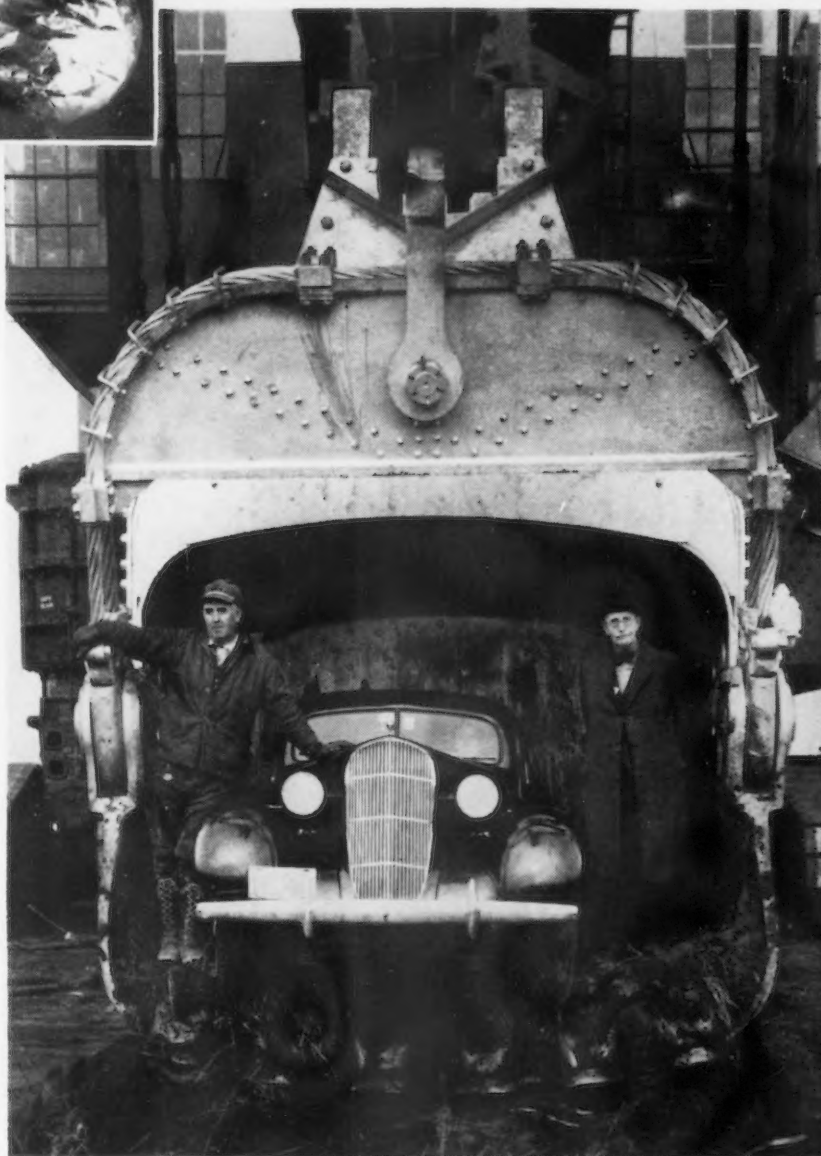
He went to Pittsburgh and received for the first time enthusiastic support both financially and morally. Alfred E. Hunt and George H. Clapp, of the Pittsburgh Testing Laboratories, provided this support. On Sept. 18, 1888, The Pittsburgh Reduction Co. was started with \$20,000 cash working capital. By Thanksgiving, 1888, a modest plant was operating on Smallman Street, Pittsburgh, and producing 50 lb. of aluminum per day.

It was soon demonstrated that this plant could produce the metal at less than half the cost of the Deville-Castner process, which was the best of the then known methods. The first Hall process aluminum was sold at about \$5 per lb., but the metal accumulated so rapidly that it was soon offered at \$2 per lb. in 1000-lb. lots. The subsequent history is one of ever in-

creasing facilities for production and a reduction of price to around 20c. per lb.

At the beginning of this article, a photograph shows the natural size of some of the original globules of aluminum from Hall's experiments. With this picture, a view is given on a much reduced scale of part of the inventory of new aluminum ingot about fifty years later. Quite a contrast!

One might conclude that by comparison Hall's showing has its pathetic aspects. If so, it would be like older but lesser people viewing the baby Abraham Lincoln, accenting his helplessness rather than his potentialities. The modern picture differs from Hall's largely in magnitude rather than in kind. He discovered an eternal principle which can never be extinguished or consumed. Like the human

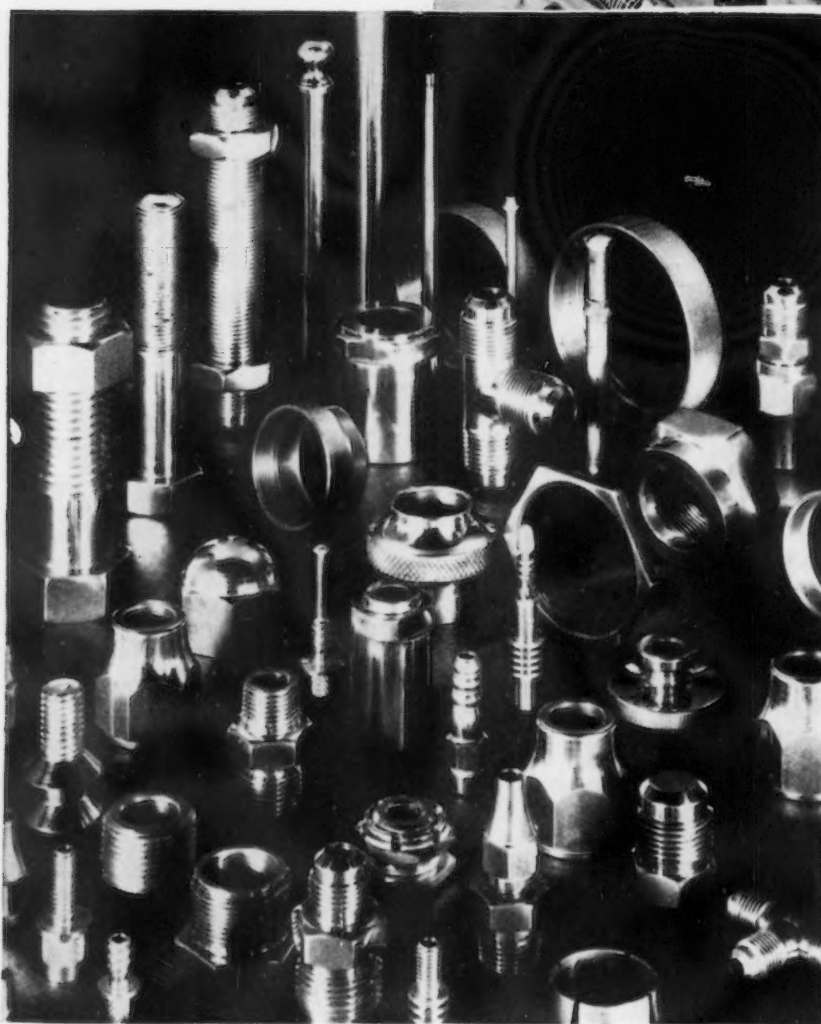


mind, the more it is used, the more potent it becomes. With that equanimity we could consider the vastness of space if someone could only give us an explanation of what a cubic millimeter of it is like! How simple would the aggregation of billions of aluminum atoms seem if we could but thoroughly understand one of them! No, any thought of the pathetic aspects of the comparison soon leads to increased admiration for Hall's achievement and finally, when it is learned that his method is still used exclusively throughout the world, the plain truth registers—both of the pic-

o o o

BELOW

ALUMINUM screw machine parts. The diversity of application illustrates the adaptability of the metal.



ABOVE

ALUMINUM collapsible tubes are used in the packaging of many commodities.

o o o

tures are exhibits of Hall Process aluminum.

Magnitude of Industry

Hall died Dec. 27, 1914, but not until he had witnessed a most rapid industrial growth of the aluminum industry based on his process. He also was rewarded by a well deserved financial success and was honored by his professional colleagues when the Perkin gold medal, sponsored jointly by three national chemical societies, was awarded to him.

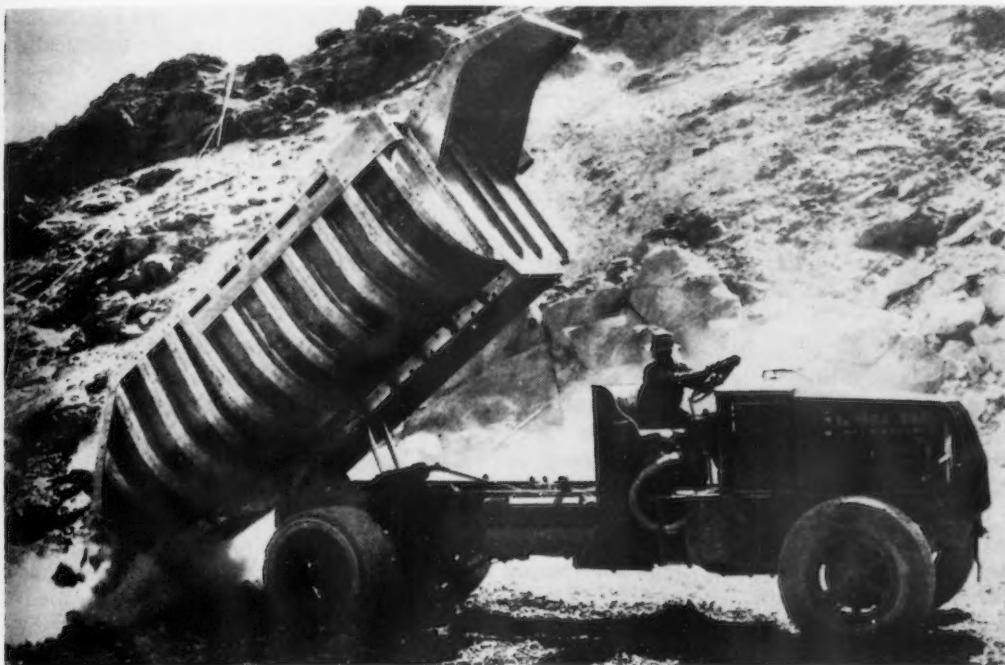
Now what is the structure which

has been built on this foundation? One should first consider the magnitude. The largest world production of aluminum in any year was almost 280,000 tons in 1929. But it is quite probable that the 1936 production will register a new peak. To place the aluminum industry on the calendar with re-

have been distributed in the United States as shown in Table I.

Aluminum is used in many places where other metals could also be used. Where it is adopted for such uses, it must of course prove some superiority either in utility or economy, or both, because there is intense competition

industry has been built around aluminum. Here we find a splendid example of the expansion of all industry as a result of the development of a new one. Is there any doubt about the generous use of copper in the electrical industry increasing the steel business? Are not more steel and copper and alu-



o o o

AT LEFT

A 25-ton dump truck constructed of strong aluminum alloy.

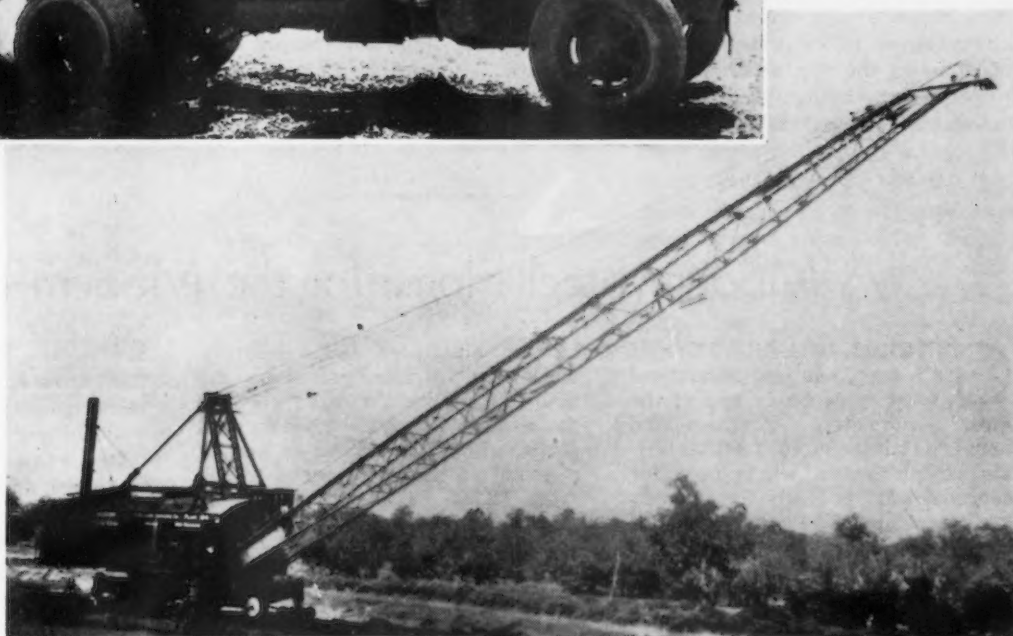
o o o

o o o

AT RIGHT

A 175-ft. dragline boom. The use of aluminum in the construction of the boom insures greater reach, speed and capacity.

o o o



spect to other metals, it may be interesting to ascertain the dates when the other metals having greater production attained the same cubic foot production as that of aluminum in 1929. They were, for pig iron, about 1810; for zinc, about 1907; for copper, 1911; and for lead, 1912. More cubic feet of aluminum were produced in 1929 than of zinc, copper or lead in 1921.

Over a period of years, the uses

among the suppliers of engineering materials. The economic value of aluminum resulting from such uses would alone provide ample sociological justification. There are, however, many uses which have made new industries and which have in turn enriched our lives.

For instance, it is difficult to visualize what the vacuum cleaner industry would be today if it were not for aluminum. The aircraft and hence the air transportation

minum used in the automotive industry than would obtain if lead were not available for storage batteries and tin for bearings? Will not the aircraft industry still further increase the consumption of steel and copper? The aluminum industry believes this is true.

Aluminum even now occupies such an important place in industry that, if we were suddenly deprived of its further use, the result would be nothing short of an

engineering calamity. Where would one turn to duplicate its effects as a deoxidizer in the manufacture of steel? Important alloys of which it is a minor constituent would be unavailable. Could we turn readily away from the safe, silent, smokeless, photoflash lamp for photographic work to the older means? What a dislocation the giving up of aluminum paint and aluminum foil for packaging would make! The aircraft industry would be forced to try a new beginning. We would be deprived of much new knowledge of astronomy now being gained by the use of the large reflecting telescopes.

But why go on? The world is not to be deprived of this useful metal. Rather, we are to have more and more of it in the future. Its properties, cost and abundance in nature assures this. The newer alloys, heat-treatments and surface finishes provide even greater versatility than that upon which the present industry has been built. One of the new alloys, for example, was used to salvage the Smithfield Street bridge across the Allegheny River in Pittsburgh. Here 350 tons of the new alloy was employed in the bridge floor and reduced the load on the trusses 750

TABLE I
Percentage of Aluminum Used in Various Industries in the United States

	Per Cent
Transportation (land, air and water)	38
Electrical conductor.....	16
Cooking utensils.....	14
Machinery and electrical appliances	9
Iron and steel metallurgy....	8
Building construction.....	4
Miscellaneous foundry and metal working.....	4
Chemical	2
Food and beverages.....	2
Miscellaneous	3

tons. This weight reduction was sufficient to increase the life of the structure for at least 25 years.

The heat-treatment of aluminum alloys is now as common as the heat-treatment of steel. Surface finishes such as the anodically treated surfaces, colored or not, are making aluminum adaptable for use in many new places. A specially treated surface for the reflection of light and radiant heat is now in process of profoundly changing the lighting industry. A new wrought strong alloy with

free machining properties like leaded brass has just been put on the market. Alloys with surprising resistance to various forms of corrosion are now available in both cast and wrought products.

The wrought aluminum products range from leaf 0.0002 in. thick to forgings and plate weighing a ton or more. Castings vary from pieces the size of a thimble to ones weighing more than two tons. Aluminum is fabricated by practically every process common in the metal working art and the products peculiar to these processes are available to engineers. The amounts used in various units range from a fraction of a milligram in the aluminum ink used for a dash of "silver" in an advertisement to millions of pounds used in structures like the Empire State and Rockefeller Center buildings.

Research on new alloys, new processes, new and improved products, and new applications is proceeding on a substantial scale. Many new developments have been made in the past fifty years, and they are being made at an ever increasing rate. All these and more have been built on the foundation laid fifty years ago by Charles Martin Hall.

A Modern Steel Home for the Modern Family

GENERAL HOUSES, INC., of Chicago, has just announced what is probably one of the most completely prefabricated houses yet introduced. All materials except that which is used for concrete work is ready for immediate assembly. The frame consists of copper-bearing steel columns and beams. The exterior walls are made of prefabricated asbestos-cement and plywood panels with

built-in aluminum foil insulation, while the interior partitions are made up of prefabricated plywood panels and copper-bearing steel studs. The illustration is one of a group of houses designed to sell from \$2,500 to \$4,900 completely erected and equipped. Equipment includes an oil-fired warm air heating system, winter air-conditioning plant, oil-fired automatic hot water heater, complete bathroom with all

accessories, kitchen sink and four steel kitchen cabinets, two-compartment laundry tub, all interior and exterior painting, electric wiring, water, gas and sewer piping within the house and a 220-gal. oil storage tank. A national system of dealer-distributors is being developed by General Houses to handle its products. Howard T. Fisher is president of the company.



Skilled Labor in The Making

By JOSEPH K. CLOSE

Toledo Associates

MANY things besides wages and dividends dropped during the depression, among them being vocational training. With so many workers going out of skilled jobs and finding new ways to make a living and practically no one replacing them it is no wonder that we are faced with a skilled labor shortage.

The effect is serious beyond the inconvenience caused, for the supply of

skilled labor determines the use of unskilled labor as well. Thus if factory operations are curtailed by scarcity of men to fill the key positions of skill, operations cannot expand to reemploy the unskilled.

The Toledo vocational training plan, as described in this article, is producing results and deserves the careful consideration of industrial groups elsewhere.

which they will face unless steps are taken to avert it.

It is not hard to see that a shortage of skilled labor may exist. Many factors in the past five years have tended to make it a fact. The prime reason is the almost complete breakdown of the American apprentice system during the depression years. Following 1929, sales and orders were continually decreasing. Industries went in the "red." Highly competitive selling conditions made it necessary to rush production orders through with a skeleton working force to keep costs down. Manufacturers had all they could do to keep losses as low as possible—and the apprentice system almost completely passed out of existence. The highly skilled mechanics who had to take enforced layoffs, being of the more aggressive type of workers, drifted into other lines of work. Many of them started up small businesses of their own, took up selling or engaged in farming on a small scale. Some found their new work more stable than the uncertainty of industrial production during depression and have remained in it. And as the highly skilled laborer was usually of the older class of workers, death, too, has been a factor, taking its toll from the ranks of the skilled labor supply. This outgoing movement among



FROM the cry that has gone up from many industrial sectors, the skilled worker seems to be among the vanishing Americans. In a mid-western city a two-week search for six highly skilled mechanics brought 25 applicants, out of which only five men could qualify for the job. In another instance, a manufacturing firm admitted having men working for them who are not up to their requirements because skilled men have not been available. Just recently, an Ohio manufacturer was forced to import skilled men from Pennsylvania and Indiana to fill his production requirements. Whether the condition

is general in industrial circles cannot be definitely stated. In some sectors, manufacturers have experienced no such skilled labor shortage. Union leaders claim they have men capable of filling any industrial need. Be that as it may, the fact that a shortage of skilled labor does exist in certain sectors may be taken as the "handwriting on the wall," which means greater opportunity for the alert worker who will be prepared to fill any emergency requirements for highly skilled craftsmen when and if it becomes general. It should serve as a warning to industrial employers that the possibility of a skilled labor shortage is something

skilled labor was a net loss—for, with no apprentice system in operation, their place in industry has not been filled. If this gap in the ranks of skilled labor is not felt now, it is sure to be at some future date, for you can't expect to take these men out of the ranks, cut off the source of supply, and arrive at any other result—unless labor and management take some steps to remedy the situation.

Other Factors at Work

But there are other factors which have been quietly at work for years developing a small group of skilled workers. The most potent factor and the one which has played a prominent part in its service to management and labor is the nation's vocational school system. Generally speaking, the service which this educational force is rendering industry is not fully appreciated. Changing times have placed greater importance upon the part our educational system will play in providing for the welfare of our workers. The great industrial interests in the United States and their steadily increasing development has made it essential that upon the foundation of academic education must be built the superstructure of vocational training to better equip the younger generations to earn a living and enjoy life. The sooner management and labor realize the important influence vocational training has upon the development of industrial relations, efficient production and the welfare of workers, the better it will be for all concerned.

Let's take the Vocational High School of Toledo as an example because it is the second oldest training school in the country, and because it has developed one of the most complete and advanced programs of trade-school training in the country. The purpose of this school is primarily to advance the individual by helping youths choose, learn and master a trade. It is in effect a course in training for social security by improving the qualifications of the young men to meet the greater demands in industry for highly skilled workers and to increase their earning power. Industry derives benefits through the development each year of a small number of young, potential skilled workers who have a thoroughly sound fundamental knowledge of a trade and who will adjust themselves more readily to in-

dustry. The community gains because a better worker is a better citizen.

A Planned Program

The manner in which these results of vocational training are achieved is through a carefully planned program. Unlike ordinary high schools, the Toledo Vocational High School maintains close contact with Toledo industries. It applies classroom instruction to practical training in the school shops and includes actual experience at the trade. These factors have brought advantages to both the young men in training and to industrial plants. The curriculum of this leading training school consists of instruction in seventeen trades, including pattern making, mechanical drafting, machine shop practice, electricity, cabinet making, carpentry, printing, plumbing, commercial art, automobile mechanics, architectural drafting, sheet metal work, welding, automotive electricity, aeronautics, commercial office practice, and retailing — plus twenty-one related subjects. This training is offered through four courses:

1. Full-Time Trade Preparatory Course—Classroom and shop instruction throughout four regular school years.

2. Half-Time Cooperative Course—(a) 3 years, full-time course; (b) 1 year, half-time in school, half-time on job.

3. Trade Extension Plan—(For full-time apprentices in industry—to give them instruction on subjects technically related to their jobs) 4 hours a week in school on such subjects as job analysis, blue print reading, sketching, drafting, layout work, shop organization and mathematics.

4. Employee Training Plan—(a) Instruction to worker on the job in his plant; (b) On any operation or process; (c) On the following related subjects—blue print reading and sketching, applied drafting and layout work, shop theory, job analysis, applied science, and practical mathematics.

But that is only a part of the service which the Toledo School provides. It offers to industry the facilities for foreman training, leads foremen's conferences, plans conference leadership programs. It also performs special services to industry, two recent typical examples of which are the establishing of a complete program of eleven Quality Control meetings for the DeVilbiss Co. in Toledo, and conducting a series of conferences on topics in which the employees at the Gray Print-

ing Co. of Fostoria, Ohio, were interested. In addition, the school maintains an employment service which serves in supplying employers with young workers trained in their trades.

Idea Should be Widely Adopted

When one has a complete picture of the facilities and operation of public schools like the Toledo Vocational High School, it is easy to see the important place it occupies in the industrial world. Fortunate indeed are the communities that have public schools of this type in their city to help promote industrial efficiency. Alert industrial executives everywhere will do well to promote the development and extension of the nation's facilities for vocational training. They can take their cue from a group of Toledo business men who have organized a movement to secure government financial aid for a new building and new equipment for the Toledo Vocational High School so that its benefits to workers and industry may be increased.

A simple and effective means of developing skilled labor that is open to every industrial executive and one that is easily used is the training of workers by foremen. As a rule foremen are in a strategic position to do this work. They have a knowledge of their trade and its specific application to the particular type of work in the plant. They work shoulder to shoulder with the men under them and are familiar with their capabilities and deficiencies. They are able to judge the type of work that each man is qualified to perform. Often, they are able to arrange jobs and work schedules to develop the skill of men along the desired lines.

Many manufacturers have recognized the important part their foremen organization can play in the development of skilled men. They are giving their foremen a free hand in advancing this program. They are working closely with foremen's clubs and encouraging their men to join as a means of broadening their knowledge of practices and methods used in other plants. It all helps to build up the supply of skilled labor.

Another factor that is advancing skill in industrial crafts is the development of hobbies. How can a hobby possibly affect the supply of skilled workers? For anyone who

has studied the hobbies of industrial workers, the effect is apparent. There are innumerable cases where skill at hobbies has developed entirely new products, a few examples of which are the kiddie car, pork rind fishing bait, miniature boats, toy building sets. Hobbies related to the employees' shop work have increased the efficiency of workers at their trades. In many cases hobbies have developed new talents which have completely changed the profession of a worker.

What Hobbies Do

In Toledo where two large hobby shows were held this year, a study of hobbies revealed many interesting facts. Nearly 1200 products of spare time workmanship were ex-

hibited at the two shows sponsored by the Toledo Scale Company for its employees, and by the Foremen's Club for all industrial workers. In a surprisingly large number of cases, the products of leisure workmanship were closely related to the worker's trade. Fourteen per cent of the exhibits of Toledo Scale employees were products which pertained to their trade. In the city-wide hobby show sponsored by the Toledo Chapter of the Foremen's Club the same condition existed.

These facts are convincing evidence that hobbies and spare time work are a factor in developing skill among industrial workers. And looking at it from another angle, they give industrial executives an insight into previously un-

known talents of their employees which may result in their being placed on work for which they are better qualified. Industrial executives will do well to promote hobbies among their employees for it has proved to be another important approach to greater efficiency in industrial workmanship.

The development of skilled craftsmanship among industrial workers through vocational training, instruction by foremen and the promotion of hobbies is a movement that will become increasingly important as business conditions continue to improve. Because of their effect upon industrial production, alert industrial executives with an eye to the future will do everything possible to promote them.

Knowledge of Color as an Aid in Finishing Operations

UNTIL recently a pioneer country, the United States has excelled in things utilitarian, as is not to be wondered at in view of the abundant natural resources that invited conversion into useful products. On the other hand, our conceptions of art were, for years, derived from foreign sources and our esthetic taste was not highly developed.

But America is truly coming of age. Of late years utility alone has failed to satisfy popular cravings. The American public has become style-conscious, and a far-reaching change in the design of manufactured products, and especially consumer goods, has taken place. Emphasis on design has been followed by greater attention to finish, and now enthusiasm for finish is being augmented by a rising interest in color.

Color's appeal to the eye is as great as music's appeal to the ear, but knowledge of color is almost negligible as compared with the widespread knowledge of music. It has been as difficult to describe a color as it was difficult to describe music before a standard method of musical notation was adopted. The use of color has been left to individual taste and success in selecting and combining colors to produce a pleasing impression has been

regarded as an art for which no standard rules existed.

It will come as a surprise, therefore, to those who have heretofore taken only a casual interest in color, that a science of color is being developed and that facts thus far disclosed are of immediate practical advantage to all manufacturers using color. In three monographs, beautifully illustrated in color, the International Printing Ink Corp., 75 Varick Street, New York, discusses "Color Chemistry," "Color as Light" and "Color in Use." From a practical point of view manufacturers finishing their products in color will be most interested in the volume on "Color in Use." This monograph makes it clear that there really is "rhyme and reason" to the selection of effective color combinations. Not merely a book but a real tool for use, this monograph discloses how to describe a color correctly; defines the three dimensions of color—hue, value and chroma; points out how the effects of backgrounds may be anticipated; how visibility, legibility and power can be controlled; defines color relationships; sets forth rules for color balance, the use of complementaries, neighboring colors and triads, and includes a copyrighted device for selecting color schemes.

The other two monographs are essential to a better understanding of color and are couched in language that anyone with a knowledge of high school physics and chemistry can understand. "Color Chemistry" begins with a résumé of the early natural sources of color, but quickly brings the reader to the modern synthetic sources. Emphasis is placed on the organic compounds, since most modern colors are of this type, more than 2000 individual color compounds built around carbon being in constant use, as contrasted with hardly more than 100 colored materials derived from any of the other elements.

"Color as Light" discloses that the visible spectrum is a part of the much larger electromagnetic spectrum. In this volume emphasis is placed on the measurement and specification of color through the use of transmission and reflectance curves such as are produced automatically by the new Spectrophotometer made by the General Electric Co. and invented by Dr. Arthur C. Hardy of the Massachusetts Institute of Technology.

The three volumes may be obtained from the International Printing Ink Corp. for \$10, plus postage.

Corrosion After Pickling

Major Source of Galvanizer's Dross

By WALLACE G. IMHOFF

Consultant for Zinc Coating,
Vineland, N. J.

THE first of this three-article series which appeared in THE IRON AGE of Dec. 5, 1935, discussed the reducing action of molten zinc at galvanizing bath temperatures on ferrous sulphates, ferrous chlorides, the light yellow "sulf" (limonite) or

water rust, and the darker brown and red rusts of ferric oxide formed on the surface of work while drying. This second article discusses the same action, under identically the same experimental conditions, on the magnetic oxide of iron.

tion, began at once, taking place slowly at 800 deg. F. and finally reached a violent action, or thermit reaction, at 1100 deg. F., giving off much light and heat.

- (3) That at temperatures well above galvanizing temperatures the zinc completely reduced the iron oxide forming first the zinc-iron alloy, then the dross crystals the same as found in galvanizing baths, and at the higher temperatures a zinc-iron alloy crystal of a different form. At the same time a large amount of the zinc was oxidized to zinc oxide.

The results are somewhat different for the action of molten zinc at, and above galvanizing bath temperatures, on the magnetic oxide of iron. It is of practical interest to state where this magnetic oxide of iron is found. In this connection it may be said to be the middle, or half way condition between the unpickled raw scale on the one hand, and the completely pickled and



IN order to bring out, or contrast the differences in the reducing action of molten zinc on the magnetic oxide of iron as found in this series of experiments, it is well to briefly call attention to the most important facts disclosed

in the initial section of this article which appeared in the Dec. 5 issue of THE IRON AGE. These points are as follows:

- (1) All of the iron salts and iron oxides were very easily reduced by the molten zinc.
- (2) The alloying, or reducing ac-



FIG. 1—Results obtained when molten zinc and iron oxide (magnetic oxide) are heated together for 6 hr. and cooled slowly. As indicated, the tests were made at various temperatures throughout the galvanizing range, up to a final temperature of 1565 deg. F.

easily corroded surface on the other. It represents a condition of the surface as not being "completely" pickled. In many cases the work is galvanized when all of the scale and iron oxides have not been completely removed. This always requires a longer submersion time in the zinc, and a higher bath temperature to obtain a perfect coating. This second part will reveal why this is the case, and what happens to this unpickled magnetic oxide of iron.

As the articles leave the pickle the surface may look clean, but embedded deep down in the surface are the very fine particles of scale and black magnetic oxide of iron. When the work lies on the dryer, corrosion starts in at once to break down this magnetic oxide of iron into rust, the ferric oxide of iron. This may not be complete by the time the work goes into the galvanizing bath so that here is perhaps a condition where there is rust, there is magnetic oxide of iron, and perhaps even some small particles of scale present. The rust is acted on at once and the iron is easily reduced as described in part

one. But the magnetic oxide of iron embedded in the surface still, and the scale are not so easily reduced. The action of the molten zinc on the magnetic oxide of iron will now be given.

Experimental Procedure

The method of conducting the tests for the reducing action of molten zinc on the magnetic oxide of iron was exactly the same as that used for the action on iron salts and the ferric oxide of iron. (See *THE IRON AGE*, issue of Dec. 5.) A weighed amount of zinc and magnetic oxide was placed in a clay crucible which was absolutely free of iron in any form. Melts were made at 800, 850, 900, 950, 1000, 1100, 1300, and 1565 deg. F. Each crucible was placed in a definitely controlled furnace where it was heated up to the required temperature. It was held there for 6 hr. and every 2 hr. the melt was stirred thoroughly with a glass stirring rod. At the end of the 6-hr. heating period the gas in the furnace was shut off, and the melt allowed to slowly cool in the furnace

overnight. The next day the melt was examined. One-half of it was used for making chemical analyses and other chemical tests; the other half was carefully prepared and examined under the microscope. The results of these tests will now be briefly described.

Fig. 1 shows the melts after they had all been removed from the clay crucibles. It is well to bear in mind that the galvanizing range is under 900 deg. F. There are times when the bath does exceed 900 deg. F. in practice so the results at the higher temperature therefore take on more importance. Attention is called to the fact that the oxidation of the melts is seen at 1100 deg. F. by the lighter color. Those under 1100 deg. are seen to be blacker in the figure.

As in the previous article of this series, no attempt will be made to go into too much detailed discussion. The remarks will be limited mainly to those points which seem important enough to mention. Fig. 2(a) shows a part of the melt after the molten zinc and magnetic oxide of iron had been heated as described at the temperature of 800

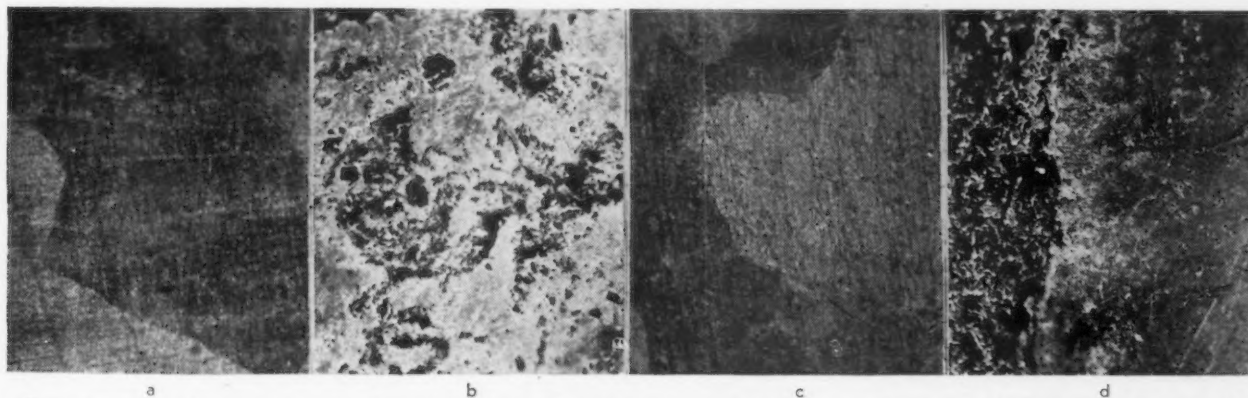


FIG. 2—Zinc and magnetic oxide of iron heated to (a) 800 deg. F.; (b) 850 deg. F. (illustration from top of melt); (c) 900 deg. F. (illustration from bottom of melt); and (d) at 950 deg. F. In each case the mixture was maintained at the maximum temperature for 6 hr. and slowly cooled in the furnace overnight. Stirred every two hours. Each picture taken at 36 diameters.

deg. F. This illustration was made on a solid part of the melt. The facts obtained from closely studying all parts of this melt are,

- (1) Very large crystals of zinc are present.
- (2) Zinc-iron alloy is present.
- (3) Undigested particles of magnetic oxide of iron were to be seen at the top of the sample.
- (4) The zinc-iron alloy has impregnated all the zinc crystals to a more or less extent cutting them up into small blocks or cakes.
- (5) No actual dross crystals could be found.
- (6) No segregation of rich granular zinc-iron alloy could be seen.



FIG. 3—Zinc and magnetic oxide of iron heated to 1000 deg. F. for 6 hr. and slowly cooled in the furnace overnight. Stirred every two hours. The view on the left was taken at the top of the melt, and the view on the right was taken at the bottom of the melt. Each photo at 36 diameters.

(7) The top of the sample was very porous and contained large amounts of undigested magnetic oxide of iron.

(8) No rich granular zinc-iron alloy could be seen at the bottom of the melt.

(9) Very small amounts of zinc oxide could be identified in the porous part of the melt at the top.

(10) The reducing action of the molten zinc (oxidizing action of the iron oxide) is very much less than that of the ferric oxide of iron at the same temperature.

Turning from the melt at 800 deg. F. to the one at 850 deg. F., the illustration shown in Fig. 2(b) was taken at the top of the melt. The picture at the bottom of the melt was much like that just described in Fig. 2(a), so that the top has been selected at 850 deg. F. to show what the top looks like. This is clearly shown in Fig. 2(b).

A summary of the important observations made in connection with Fig. 2(b) is as follows:

(1) The spongy porous character of the metal.

(2) The many particles of undigested magnetic oxide of iron.

(3) The zinc-iron alloy formed in the areas of the magnetic oxide of iron particles.

(4) The zinc area is filled with patches of zinc-iron alloy.

(5) This microscopic examination clearly shows that there is less action on the magnetic oxide of iron than on the ferric oxide of iron at the same temperature.

Observations at 900 Deg. F.

Passing on to Fig. 2(c), the reducing action of the molten zinc at 900 deg. F., the ordinary limit of galvanizing bath temperatures is

writer has called attention to the fact that the critical point, in so far as temperatures are concerned in galvanizing, is at a point between 900 deg. and 950 deg. F. This fact is again brought out clearly by the results found when the melt at 950 deg. F. was examined.

Fig. 2(d) illustrates the point at which definite dross crystals can be recognized. Here is the first conclusive evidence that dross is formed by the reducing action of molten zinc on the magnetic oxide of iron. But the clean-cut proof is there; well-defined dross crystals can plainly be seen everywhere. The large black crystal at the top of the figure shows one of the larger dross crystals. It again emphasizes the importance of not having temperatures above 900 deg. F. at any point in a galvanizing bath. The evidence is plain, and it is unmistakable that dross will be quickly formed at such temperatures. The important points seen in Fig. 2(d) are as follows:

(1) The development of medium-sized dross crystals.

(2) The zinc-iron alloy at the base of the figure.

(3) The zinc area above the alloy area.

(4) The contact zone between the two areas where the dross crystals can be seen developing.

(5) Definite concrete evidence that dross is formed by the reducing action of molten zinc on the magnetic oxide of iron.

At a temperature of 1000 deg. F. the results are so interesting that two views are reproduced herein. Fig. 3 (left) illustrates what happened at the top of the melt, and Fig. 3 (right) shows what was going on at the bottom of the melt. Special attention is called to the shape of the particle in the center of Fig. 3 (left). It will be noted that the shape is that of a six-sided figure, a hexagon. Also note that the particles of magnetic iron oxide have been segregated into these distinct crystal outlines by the forces of crystallization. This is indeed remarkable since very few dross crystals can be seen.

The facts as observed by the melt at 1000 deg. F. are exceedingly interesting. A summary of the features seen in Fig. 3 (left) is as follows:

(1) The large undigested areas of magnetic oxide of iron at various spots in the melt.

(2) The hexagonal shape of the large area in the middle is of special

reached. Most galvanizing is done at a bath temperature considerably under 900 deg. F. The points of interest in this melt may be summarized as follows:

(1) The large zinc crystals are not quite so distinct.

(2) The increase in the amount of zinc-iron alloy.

(3) The zinc-iron alloy has thoroughly impregnated and contaminated all the zinc crystals

(4) There are no segregated areas of zinc-iron alloy.

(5) No distinct dross crystals could be found.

(6) The zinc-iron alloy has not formed in sufficient quantity to settle to the bottom of the melt.

(7) The porous character of the melt at the top.

(8) The undigested magnetic oxide of iron in this porous area.

(9) The alloying action is much weaker, or less, than with ferric oxide of iron at the same temperature.

(10) Very faint blocks of zinc-iron alloy are beginning to develop.

In many previous articles the

interest as it illustrates the power of forces of crystallization are so strong that they draw the particles of iron oxide into the form of the dross crystal even before the iron has been reduced, and the zinc-iron alloy formed. Attention is also called to the orientation of the other particles of iron oxide tending to also form hexagons.

(3) No large dross crystals were found at the top of the melt.

Turning now to the results found in the same melt at the bottom, as shown in Fig. 3 (right) we find,

(1) Plenty of dross crystals distinctly seen floating in the zinc.

(2) The zinc area is filled with dross crystals while none are to be seen in the iron oxide. This figure shows very clearly that as the dross crystals form they settle to the bottom of the melt. Other experiments have shown the dross to be heavier than the zinc, and for this reason the crystals settle to the bottom of the melt.

(3) This microscopic view shows very clearly that magnetic iron oxide is reduced by molten zinc, and that zinc-iron alloy and ordinary dross crystals result from the action.

Observations at 1100 Deg. F.

Passing on to the still higher temperature of 1100 deg. F., the results show that the magnetic oxide is turned completely into dross by the reducing action of the molten zinc. Fig. 4(a) shows the melt at this temperature. By again referring to Fig. 1, it will be seen that a marked change takes place at 1100 deg. F. and oxidation of the zinc sets in. The features of importance here are the presence of dross and the oxidation of the zinc.

The features of special importance noted in Fig. 4(a) are as follows:

(1) The entire melt is made up en-

tirely of zinc-iron alloy and broken dross crystals.

(2) The zinc-iron alloy which surrounds the fragments of dross crystals. The dross crystals were broken up by stirring.

(3) The fragments of dross crystals. Dross crystals were formed but were broken up by stirring.

(4) The darker phases of the zinc-iron alloy.

(5) The oxidation of the zinc-iron alloy. This is traced by the alloy becoming lighter and lighter, and finally white and yellow zinc oxide appear.

By again referring to the melt at 1300 deg. F. in Fig. 1, it will be seen that a temperature has now been reached where oxidation of the zinc in the melt is going on rapidly. This is shown by the pile of zinc oxide beside the melt. On examining this melt under the microscope as seen in Fig. 4(b) the following features of interest were seen:

(1) An area of large zinc crystals filled with small dross crystals.

(2) A very large alloy area of exceedingly small dross crystals, zinc-iron alloy, and zinc contaminated with zinc-iron alloy.

(3) Areas of zinc-iron alloy not crystallized and very rich in iron. This material if segregated would form very large dross crystals, and may be the dross crystals that have been broken up by the stirring.

(4) The presence of a dark green material which is seen to be the breaking down of the dross crystals, and which on the next step forms zinc oxide.

The final test at 1565 deg. F. shows the formation of metallic-looking dross crystals, and along with them a very dark green material which in its final stage is changed to the white zinc oxide.

The features of particular inter-

est that were found in the melt shown in Fig. 4(c) are,

(1) The metal has entirely disintegrated at the high temperature of 1565 deg. F.

(2) The material in the melt was of three types, namely, (a) a mass of dark green grains, (b) zinc oxide, and (c) very minute dross crystals.

Turning for a moment to the parts of each melt which were used for chemical analyses we find a steady increase of iron content as the temperature increases. At 800 deg. F. the iron content was 1.33 per cent; at 850 deg. F., 2.94 per cent; at 900 deg. F., 4.03 per cent, and at 950 deg. F., 4.13 per cent. No analysis was made of any dross crystals as none could be obtained separately. While the chemical data are not in perfect relation to those presented in THE IRON AGE of Dec. 5, still they show that the action of the molten zinc on magnetic oxide of iron is not quite as strong as on ferric oxide of iron; or to put it the other way, magnetic oxide of iron resists the reducing action of molten zinc to a greater degree than ferric oxide of iron.

The following conclusions are direct results of these investigations of the action of molten zinc at and above galvanizing temperatures on the magnetic oxide of iron:

(1) Molten zinc reduces magnetic oxide of iron to form galvanizer's dross.

(2) The reducing action of molten zinc on magnetic oxide of iron is not as effective as on ferric oxide of iron.

(3) The introduction of iron into the zinc increased its hardness to a great extent.

(4) Dross crystals did not appear in this series until a temperature of 950 deg. F. was reached.

(CONCLUDED ON PAGE 51)

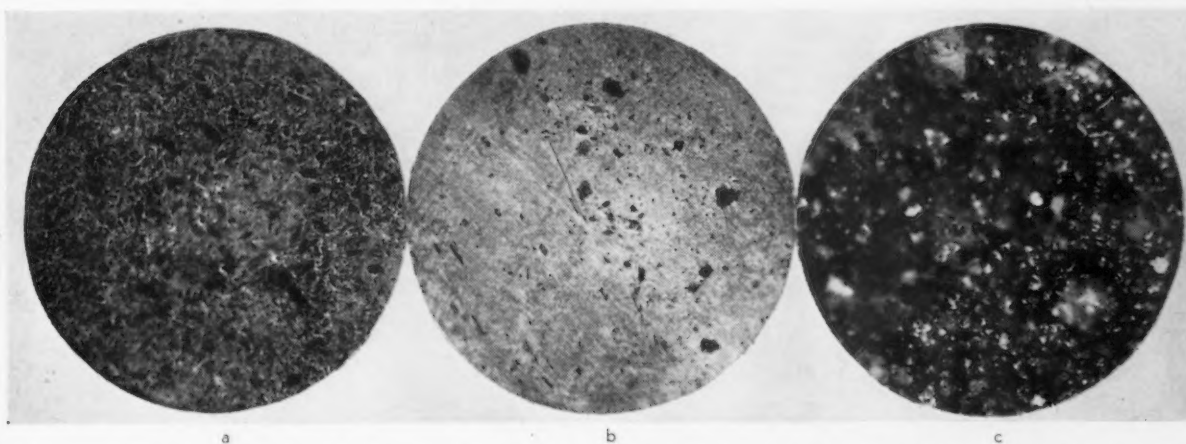


FIG. 4—Zinc and magnetic oxide of iron heated to (a) 1100 deg. F.; (b) 1300 deg. F.; and (c) 1565 deg. F. In each case the mixture was maintained at the maximum temperature for 6 hr. and slowly cooled in the furnace overnight. Stirred every two hours. Each photo at 36 diameters.

Conveyors Applied to Strip Mill Pickling Operations

By J. H. HOUGH

Sales Engineer, Mathews Conveyor Co.
Ellwood City, Pa.

*Roller Tables, Coil Upenders
and Tilting Mechanisms Used
Where Pickling is Continuous*



IN the modern strip mill where production is fast and continuous, the process of pickling sheet steel must necessarily keep

pace. This speed in pickling has been acquired through the application of more efficient equipment. The system used today incorporates conveyors which facilitate the

handling of strip steel, thus resulting in a continuous flow of materials, from operation to operation.

In the continuous pickling sys-

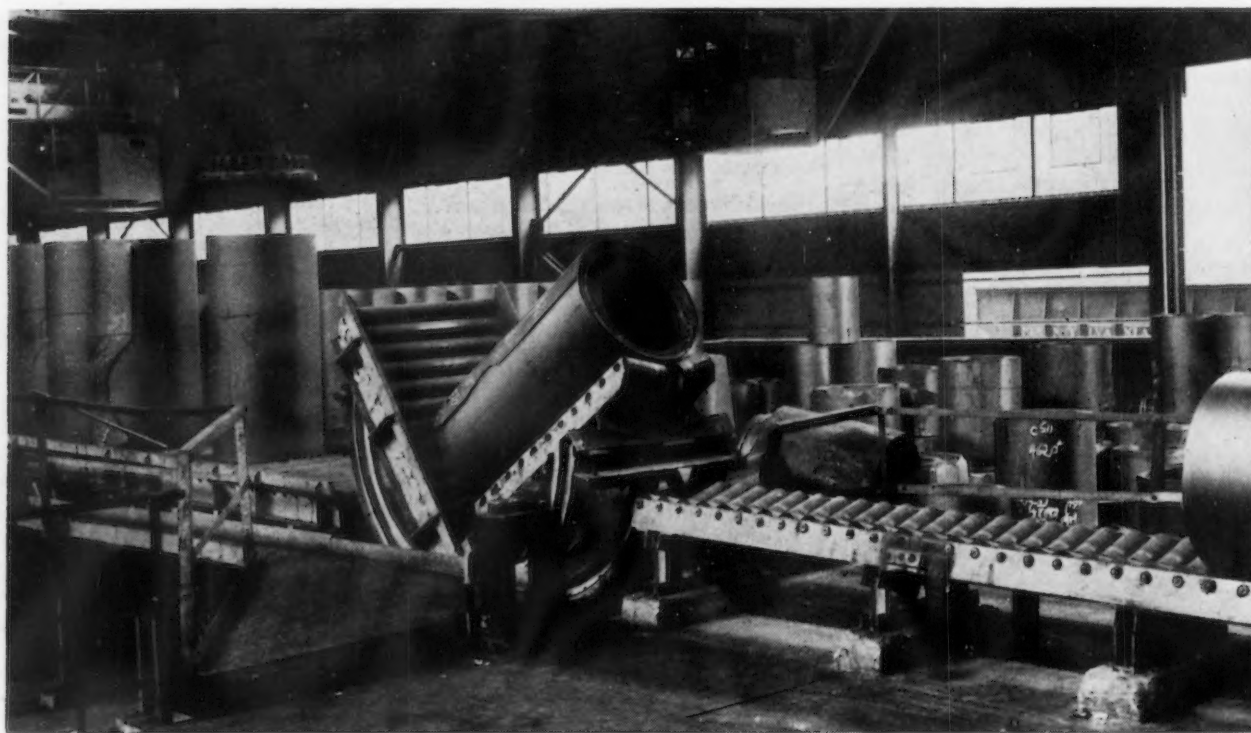


FIG. 1—An electrically operated device receives coiled steel from storage and upends each coil from a vertical to a horizontal position. Coils on their sides are conveyed to the decoiler.

tem described herein, coils of sheet steel ranging in weight from two to six tons are brought from the hot strip mill and placed in storage near the receiving end of the conveyors in the pickle line. They are removed from storage and placed on the conveyors by crane and moved toward an electrically operated coil upender. As the coils approach the upender, their speed is retarded by means of brakes under the rollers, and one at a time they move on to the coil upender. This equipment can be seen in Fig. 1.

The ball bearing rollers of the receiving section of the upender are 54 in. long and 5 9/16 in. in diameter, and form a mobile bed of rollers to handle the coils in a vertical position. The rollers of the discharge section of the upender are 12 in. long and 5 9/16 in. in diameter. They are placed in two parallel rows and are troughed to handle coils in a horizontal position. Each roller of the receiving and discharging sections has a continuous load rating of 8000 lb.

Each coil is upended quickly and smoothly, and continues on the troughed roller conveyor to a pneumatically operated tilting table. Brakes under the troughed rollers, just ahead of this table, check the



FIG. 2—A pneumatically operated 30-deg. tilting table fitted with an adjustable spring bumper is used to discharge coils from the conveyor to the decoil box.

speed of the coils as they move one at a time, onto the tilting table. This is illustrated in Fig. 2. A spring bumper absorbs the impact as the coils meet the bumper plate.

The unit operates on three

cradles, the latter mounted on flanged rollers. The rollers of this table are 12 in. long and 5 9/16 in. in diameter with a continuous load rating of 8000 lb. per roller. The spring bumper, which stops the coils as they move onto the table,

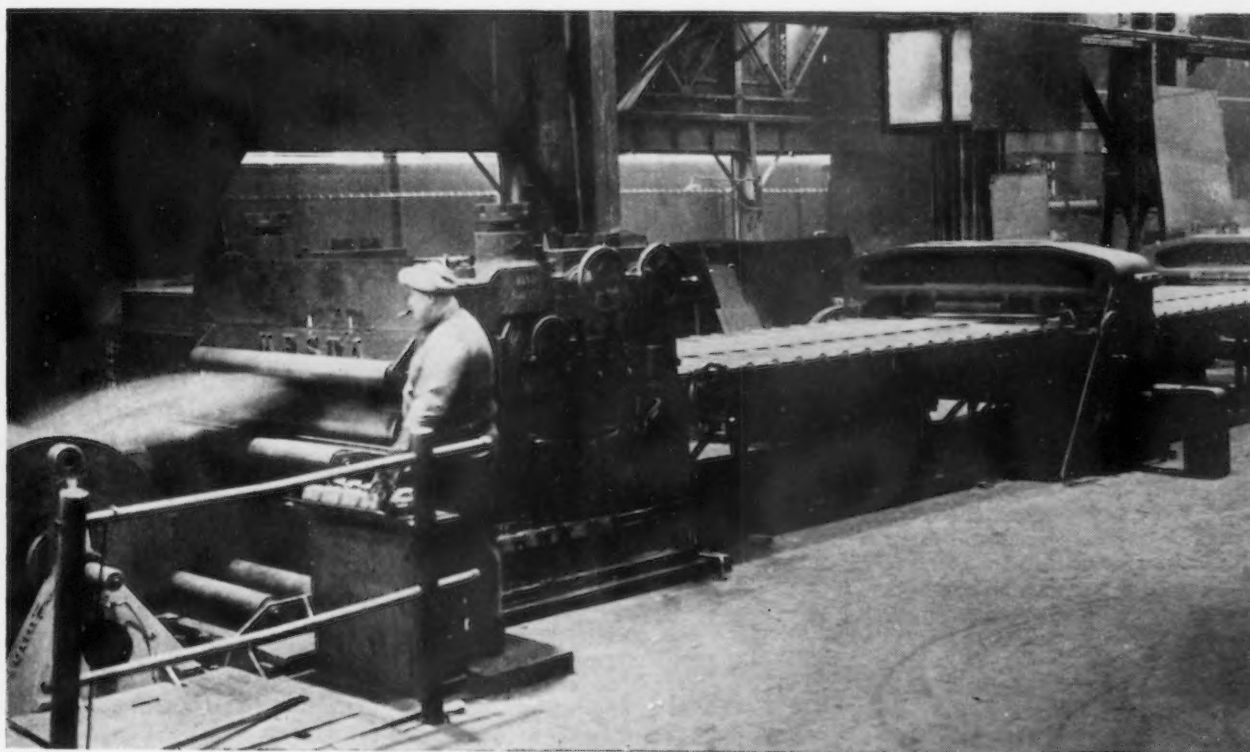


FIG. 3—Strip steel is conveyed over the roller tables, which are located between processing equipment.

is adjustable so that coils of different lengths may be handled.

This mechanism tilts at 30 deg. and discharges coils at right angles into a decoil box. At the decoil box, the end of the coiled sheet is fed into an upcut shear (Fig. 3) which removes the "fish tail" or rough end (note coils in Fig. 1). As the sheet uncoils, pinch rolls draw it over roller tables.

A stitcher, located between the first two roller tables, fastens the sheets together, i.e., the end of one coil is stitched to the end of the coil following. Thus a continuous strip of steel passes over the roller tables and through the pickling tanks, as shown in Fig. 4. After passing through the pickling tanks, the continuous strip enters a second upcut shear, which cuts the strip at each place where it had been stitched. The individual lengths are then oiled and recoiled. The coils continue to storage on a section of troughed roller conveyor.

Power operated brakes retard the speed of each coil as it moves onto a scale, which is located in the conveyor line. A pneumatically operated stop holds the coils in position on the scale while they are weighed. When the weight of the coil is recorded, the stop is released and the coil moves on to a second tilting table identical with the first which discharges the coils off the conveyor line.

The coils of steel which have been pickled, oiled, and with the rough end removed at this point are ready for cold finishing operations.

Z Piling Introduced By Carnegie-Illinois

STEEL sheet piling which is being used very extensively for heavier lateral loads and longer spans has created an increasing demand for sections having higher beam strengths. Consequently Carnegie-Illinois Steel Corp. is introducing an integral rolled Z section having a higher section modulus. The selection of a Z shaped section was made because this type has the highest beam strength for its weight according to a booklet issued on the new

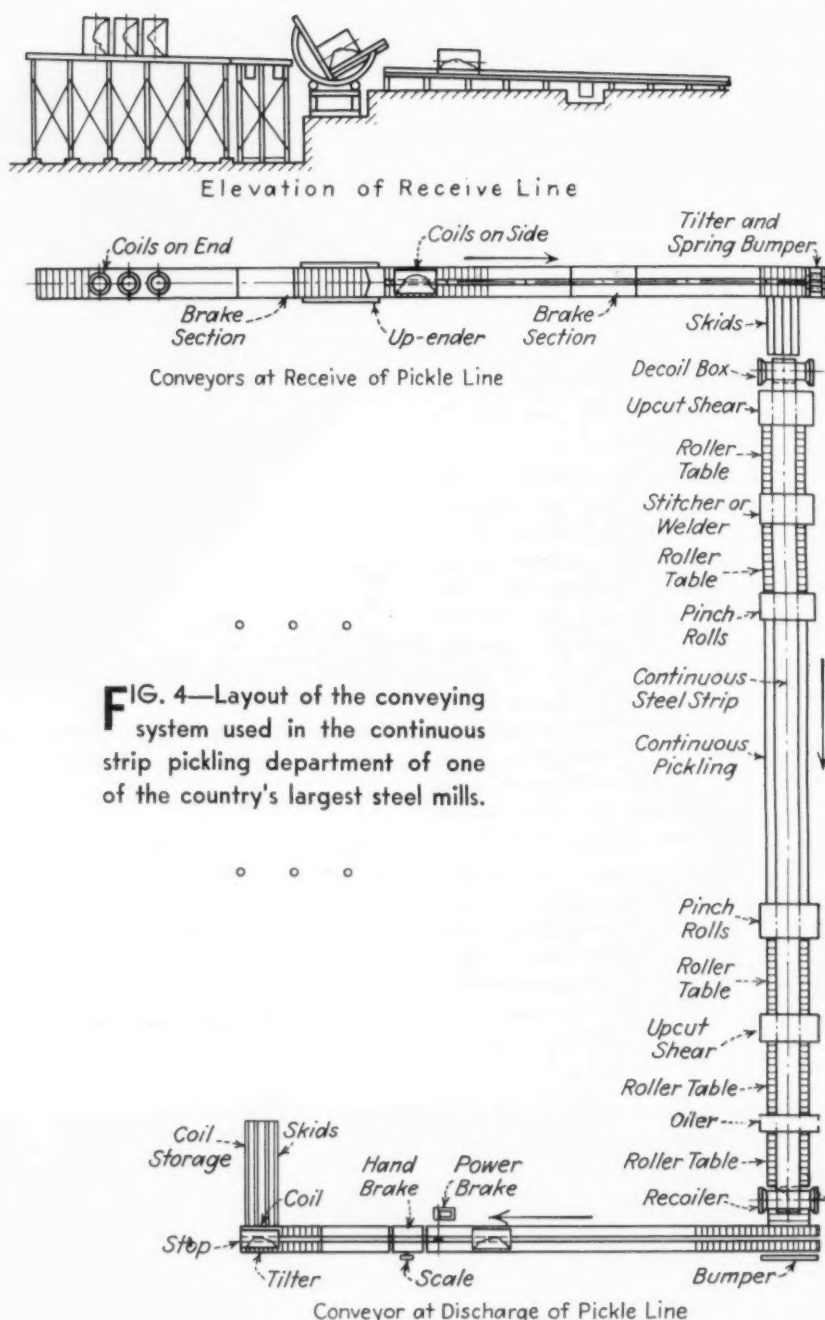


FIG. 4—Layout of the conveying system used in the continuous strip pickling department of one of the country's largest steel mills.

product. In addition, the interlocks of a Z pile are located where the longitudinal shear is zero. Therefore, the section modulus of the single uninterlocked pile is the same as when interlocked with the adjoining pile, thus making unnecessary the welding together of adjoining interlocks.

The flexibility or swing in the interlock has been reduced to an absolute minimum, which limits the twist of the pile during driving or after load is applied. A double-locking feature has been incorporated and a triangular-shaped ball selected to improve the ability of the piling to hold in line during

driving and to strengthen the interlock against failure in twisting.

The Z section, according to the company, even though it has the highest efficiency compared to its weight, has not been shorn of ruggedness, and heavy concentrations of metal have been placed at the four exposed points to stiffen the pile against heavy battering. This section, therefore, in the estimation of Carnegie-Illinois is especially suitable for deep water structures such as docks, piers, wharves, bulkheads, canal locks, sea walls, breakwaters, jetties and deep cofferdams.

Brazing New Type Tear Gas Shells In Controlled Atmosphere

ELECTRIC furnace brazing with controlled furnace atmosphere has been adopted in the manufacture of long range gas filled projectile shells for use by police officers in their warfare against crime. This type of shell is a new weapon that was recently developed by the Lake Erie Chemical Co., Cleveland, for use in overcoming with gas and making possible the capture of criminals barricaded in a building who are likely to be resisting arrest with a fusillade of gunfire at the pursuing officers.

The shells containing tear or nauseating gas or a combination of both are discharged from a 37 mm. shoulder gun and may be sent through a window at a distance of 100 yards, although they have a range of 500 yards. These long range projectile gas shells are claimed to be a great improvement over more commonly used gas shells equipped with time fuses that are thrown through a window, as they may be used without exposing the

officers to the gunfire of the men they are seeking to capture.

Different methods of joining members composing the shell were tried but did not prove successful, because the design and small and complicated parts made it difficult to reach some of the surfaces with the brazing material and because of necessity of having joints that would withstand the severe pressure of the gas within the shell. Soldering was tried in making the joints, but leaks occurred. Then ordinary copper brazing was tried, but this was unsuccessful, as the copper did not flow between the parts to be joined because of the tight fit and the brazing did not hold. Electric furnace brazing in a controlled furnace atmosphere, a process developed by the General Electric Co., is said to be the only practical method that has been devised for solving this manufacturing problem.

The projectile is composed of seven main members. The end or nose of the shell is stamped from

sheet steel. This is brazed to the body which is cold drawn steel tubing that is swaged to a smaller diameter at the lower end. Screwed to the main body is a tail assembly consisting of a tapered member of sheet aluminum, attached to the lower end of which are six stamped steel fins.

Inside the shell is a steel tubing designated as a booster tube in which is carried the explosive charge of powder, which when fired bursts the outer shell and causes the gas which is compressed in the shell to spread through the room. A firing pin in an inertia pellet in the tube is driven forward by the impact when the rapidly moving shell strikes a solid surface and hits a percussion cap that causes the firing of the explosive charge of powder contained in the tube. This explosion bursts the shell and discharges the gas.

The projectile shell is 9 in. long, its maximum diameter is 1½ in., and its weight is 13 oz. when

(CONCLUDED ON PAGE 51)

SHELL assembled
and ready for
loading in cartridge.



LONG range projectile shell loaded in its cartridge and sawed-off gun from which it is fired.

Acme Uses Modified

"Laboratory"

Slab Furnaces

o o o



WHEN a single furnace is capable of serving a mill, all the slabs or billets are similarly heated. If a second, third, or more furnaces are added to serve the same mill, then the problem of uniform heating becomes a vital one. That is to say, furnace synchronization is all important in continuous rolling to the standards established as acceptable today. The Acme Steel Co., Riverdale Works, has stabilized the heating operation attending its 16-in. hot strip mill. The problem was a matter of design wherein a new furnace differed from two others in operating characteristics which led to practical as well as economic difficulties.

When originally installed, the two furnaces of like design were built to serve this 16-in. mill. Because of the variation in character of tonnage to which this unit is adaptable a third furnace was advisable. With two similar fur-

naces operating there was little or no opportunity to ascertain whether or not those furnaces were the best for the purpose, and, further, since the furnaces were of like design the heating troubles were not fully appreciated until a third furnace of different design was installed.

In fact, when No. 3 furnace was operated in conjunction with Nos. 1 and 2, there was not only quick recognition of the favorable operating characteristics of No. 3 but all of the shortcomings of the first two furnaces were magnified. Consequently it was quickly apparent that for consistently high quality of product it would be necessary to bring the three furnaces to a parity of performance.

High Temperature Spot

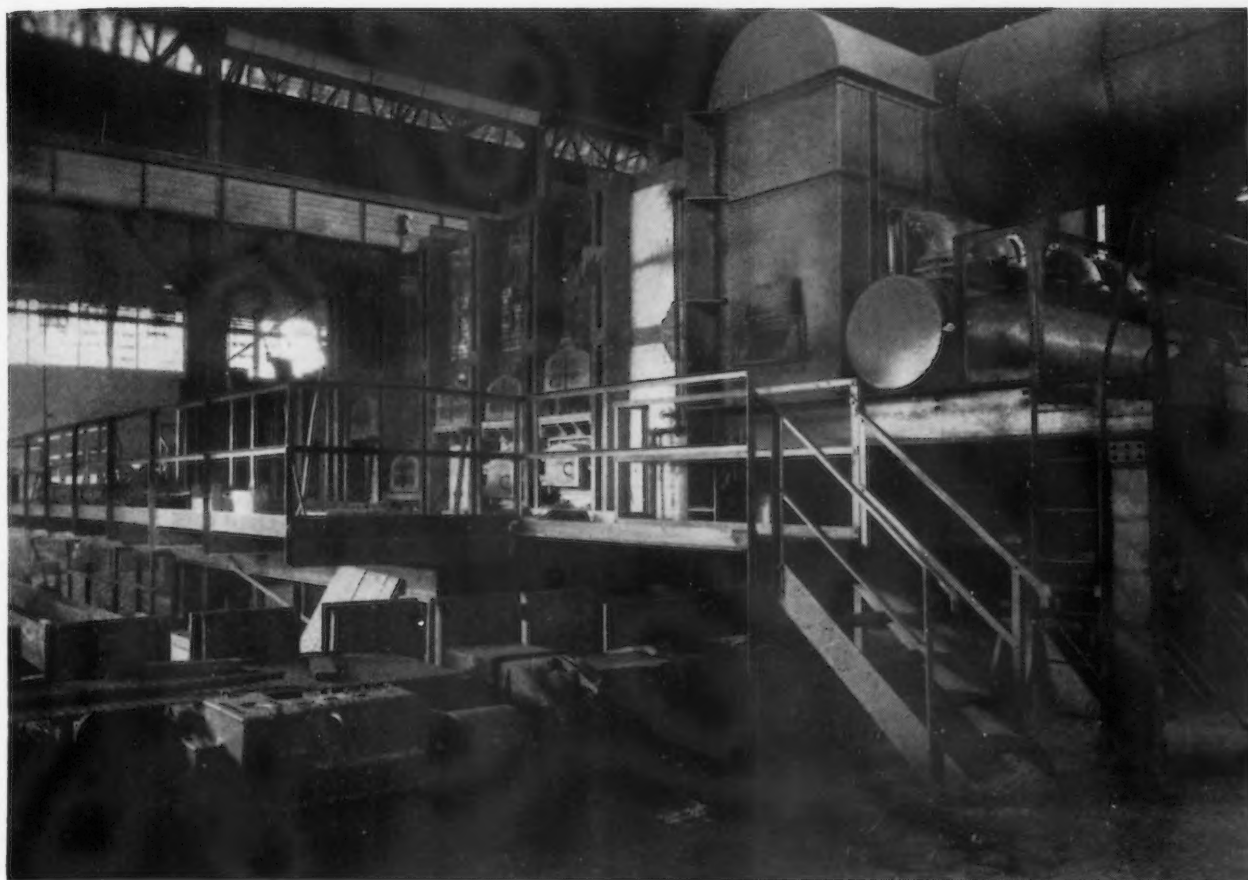
The first two furnaces were designed with water pipe skids running the full length of the furnace. The roof of the combustion chamber was high at the slab discharge end, and after a short horizontal run the roof gradually sloped downward to the charging end. Fuel was introduced in such a manner that there was a direct pull from the place of combustion to the stack. The highest temperature in the furnace was at a point back of the kick-off. The tempera-

ture curve rose rapidly to a peak of about 2900 deg. F. and then dropped from that point to the stack or down-take connection.

This point of highest temperature (2900 deg. F.) resulted in flowing of the fire brick with attendant high cost of maintenance. The direct pull on the products of combustion resulted in relatively high stack temperatures. Slabs went to the mill with skid-pipe marks on them, and lack of uniformity in heating the slabs caused serious problems in holding uniform gages at the mill.

Other problems encountered were washing of the slabs with resultant scale troubles, and the old furnaces lacked flexibility when interruptions occurred in rolling schedules. They did not have the ability to hold heat, and the slabs stuck when the furnaces were forced. If during interruptions the leading slabs were dropped out, they often were unsuitable for replacement in the charging machine. The old furnaces were "touchy" as to operation.

The original furnace, as well as the new or No. 3 unit, throughout their life have been fired by raw producer gas so that changes in fuel have not in any way influenced the results or given an advantage anywhere along the line.



EXTERNAL side view of one of the three modified "laboratory" type slab heating furnaces used by the Acme Steel Co. The burner in this furnace has been deflected down from the horizontal, the hearth is solid and the maximum temperature inside is kept uniform throughout the entire length of the "laboratory" zone.

The No. 3 furnace, built in 1928, is of the "laboratory" type as designed and built by Flinn & Dreflein Co., Chicago. During five years of operation by the staff of Acme Steel Co., comparative results were watched and the fact established that the dissimilar furnaces gave dissimilar results. Subsequently, a decision was reached to make certain modifications to No. 3 furnace and to rebuild Nos. 1 and 2 so that the three furnaces would be alike and give similar results.

The Acme management kept the principle of the "laboratory" but modified No. 3 furnace by lowering the velocity of the input gases. This was accomplished by deflecting the burner down from the horizontal thereby reversing the direction of recirculation within the "laboratory" zone. A solid hearth design also was adopted at the recirculation or laboratory end.

This laboratory type of furnace consists of a preheating zone, and a hearth or soaking zone above which is a horizontal flat roof

thereby establishing in effect a "laboratory" wherein a uniform temperature is maintained and wherein slabs are uniformly heated throughout. This flat horizontal roof is 6 ft. 2 in. above the skids. The end wall of this laboratory drops down to within 1 ft. 6 in. of the skid pipes, this design being adopted for 3-in. slabs. The roof of the preheating zone is flat and it is suspended 1 ft. 6 in. above the skid pipes.

Lower Maximum Temperature

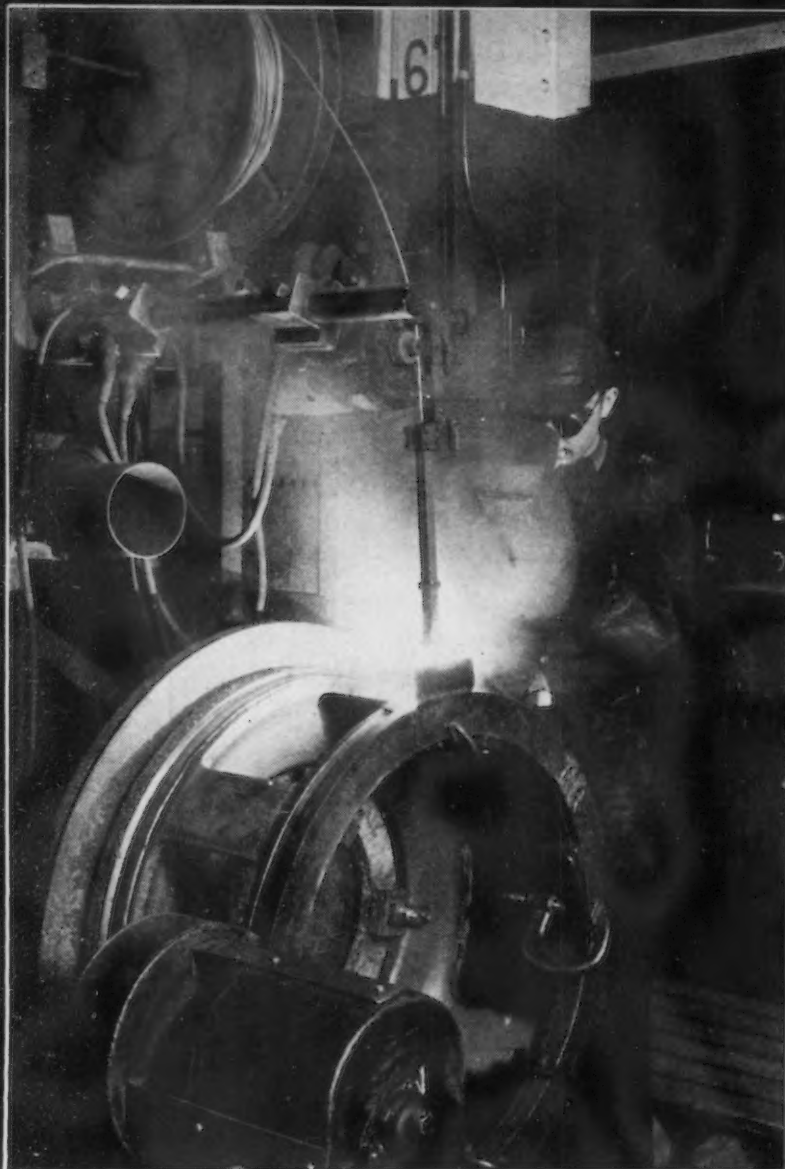
The advantages of this design are that the flame rolls in the furnace and spreads over a greater number of slabs, thereby distributing the heat over a large area. The effect is that a long hearth is established which results in holding the highest temperature to an upper limit of about 2500 deg. F. Further, instead of this top temperature being found only at one point it is found with only slight variation throughout the entire length of the "laboratory" zone. The turbulence of the gas in this

zone increases the static pressure which retards the infiltration of air.

The maximum temperature of about 2500 deg. is not destructive to brick work, and washing and sticking of the slabs is not experienced. Further, slabs are heated more uniformly. As a final analysis, the operating as well as economic characteristics of the No. 3 furnace were so superior that it became imperative to bring furnaces 1 and 2 to an operating parity so that the mill could make a product uniform in all respects.

The first step taken was the elimination of skid pipe spots. All three furnaces were equipped with solid hearths. The water cooled skids were shortened about 10 ft., and where the pipes were removed a solid hearth was built. Low carbon bars were set on top of the brick work and continued along the line of the skid pipes. These bars measured 5 in. by 12 in., and were set on edge, the spaces between them being packed with coke breeze. In this way the slabs

(CONTINUED ON PAGE 51)



(Photo by courtesy of Westinghouse Electric & Mfg. Co.)

OVERLAYING bronze on to steel rocker rings of motors for the new Pennsylvania locomotives. The work was done by automatic metallic arc welding

THE up-turn in business during 1935 stimulated many operators and manufacturers to use welding processes with copper alloys as a means of improving the quality, the economic manufacture or the economic life of their products.

Small welded hot water storage tanks, larger tanks for the storage of alcohols, acetic acid and similar chemicals, resistance welded refrigerator evaporators and flexible diaphragms, all of the Everdur metals, are finding wide usage by reason of their economy and corrosion resisting qualities. These

metals are largely copper, 96 to 98 per cent for the most part, strengthened, toughened and hardened with 1.5 to 4 per cent of silicon with additions of one or more elements.

The Everdur alloys have a strength of 50,000 lb. per sq. in. or more, with a high degree of toughness, forgability and general workability. Pressure vessels made of them are bronze welded, silver brazed, oxy-acetylene, carbon arc or metallic arc fusion welded or resistance seam welded.

Arc Welding of Copper

The fusion welding of copper was long delayed due to the high heat conductivity of the metal. This handicap has been largely overcome by the extremely rapid

Developments in

By I. T. HOOK

Research Engineer,
American Brass Co.

input of heat made possible by the long carbon arc. Thus, with an arc of 200 to 800 amp. at 40 volts across the arc and with a weld metal that will withstand this terrific concentration of heat, the operator can run along a seam in the base copper at 10 to 15 in. per min. The operation resembles the stroke of a paint brush except that the temperature of the brush is 6000 deg. F.

Phosphor bronze with 4 to 10 per cent tin and the correct amount of phosphorus and 90 per cent or more of copper will withstand this severe heat and produce in the copper strong, sound welds.

There has been a considerable extension during the year in the use of bronze welding, both in repair work and in manufacturing. The good strength, 40,000 to 50,000 lb. per sq. in., of the bronze weld metal which is combined with excellent ductility, hot and cold, made the process an economical one for many manufacturers and users of machinery. The bronze welding of cast iron, malleable iron and steel is described in some detail in a recent pamphlet issued

in Welding of Copper Alloys

by the International Acetylene Association.

Bronze Surfacing

The metal manufacturers are ready to supply the trade with almost any type of hard surfacing or wear resisting surfacing desired. Steam engine pistons or rings are coated with manganese bronze by the oxy-acetylene torch or with a high tin phosphor bronze by the carbon arc. Not a small part of the excellent performance of the radial airplane engines is due to the inserted aluminum bronze valve seats which show high resistance to the burning and scorifying action of the hot gases and to the pounding of the alloy steel valves. In diesel engines, a similar situation exists.

In the case of the common Otto cycle engine used on automobiles, trucks and buses, valve seats of manganese bronze may be flowed into place with the oxy-acetylene torch on the preheated block. Aluminum bronze would also be desirable for this purpose but it is not used as it flows very sluggishly under the torch.

Bronze surfacing by means of the carbon arc on rolled steel, cast steel and cast-iron wearing surfaces of heavy railway and industrial machinery is just coming into use. For this purpose, the long, hot carbon arc of 200 to 1000 amp. is used to flow the bronze on the cold surface to a depth of $\frac{1}{4}$ to $\frac{1}{2}$ in., which is then machined to a smooth wear resisting plane.

A high tin phosphor bronze has given good service when applied in this manner. Aluminum bronze and beryllium copper can also be similarly applied. The high zinc bronzes, as Tobin bronze and manganese bronze can not be laid

down in this manner, however, but can be applied by the oxy-acetylene method.

Resistance Welding Electrodes

Copper, by reason of its incomparably high electrical and thermal conductivity, has been the standard electrode for resistance spot, butt and flash welding operations for many years. Pure copper, however, because of its relatively low annealing point, becomes softened in some welding operations where the electrodes are subjected to grueling heat and pressure conditions requiring too frequent pauses for redressing.

Hence, alloys of copper with cadmium, beryllium or chromium are in use. Such alloys have a higher hot hardness and a higher annealing point than pure copper. The alloys of beryllium or chromium with copper are recent developments. The chromium-copper alloy in particular has good electrical conductivity combined with a high annealing point and excellent physical properties for such service.

Beryllium Copper

Beryllium copper, the strongest and hardest of the copper alloys, is finding many new applications. Among the nonferrous metals beryllium copper has an unusually advantageous combination of tensile strength, hot or cold workability, toughness, corrosion and wear resistance. For spring temper material, tensile strengths of 175,000 lb. per sq. in. are readily obtained with good residual ductility. Its wear resistance appears to be better than that of the gun metal bronzes which have been standard since 1855.

New uses include corrosion re-

sisting springs, cylinder barrels for high pressure pumps, anti-galling hub cones for variable pitch airplane propellers and gears and bushings for the retractable landing gear, and bushings for high speed spindles.

Beryllium copper may be forged, silver brazed, bronze welded and carbon arc fusion welded. Like aluminum bronze, it can not be oxy-acetylene fusion welded. Heat-treated carbon arc welds have been made in beryllium copper sheet with strengths exceeding 150,000 lb. per sq. in.

Ambrac and Supernickel Tubes

Nineteen thirty-five has witnessed a remarkable growth in the use of nickel-copper alloy tubes such as Ambrac (20 per cent nickel) and Supernickel (30 per cent nickel) for marine condensers. Such tubes in condensers using an enormous surface of thin walled tubes exposed to the corrosive conditions of sea water and steam have shown excellent performance—so much so that some ship builders are making installations for salt water lines of relatively thin-walled supernickel tubing silver brazed to cast bronze or supernickel fittings in place of the more corrodable pipes.

Ambrac and Supernickel are readily fusion welded by the oxy-acetylene torch or the metallic arc. For both of these types of welding special welding rods are employed. In oxy-acetylene welding, care must be taken to keep the metal properly fluxed in order to forestall the formation of the closely clinging, insoluble nickel oxide, while in the metallic arc welding, a heavily flux-coated supernickel welding rod is used for both of these base metals.

Broaching

Facilitates Production

Of Dodge

Connecting Rods

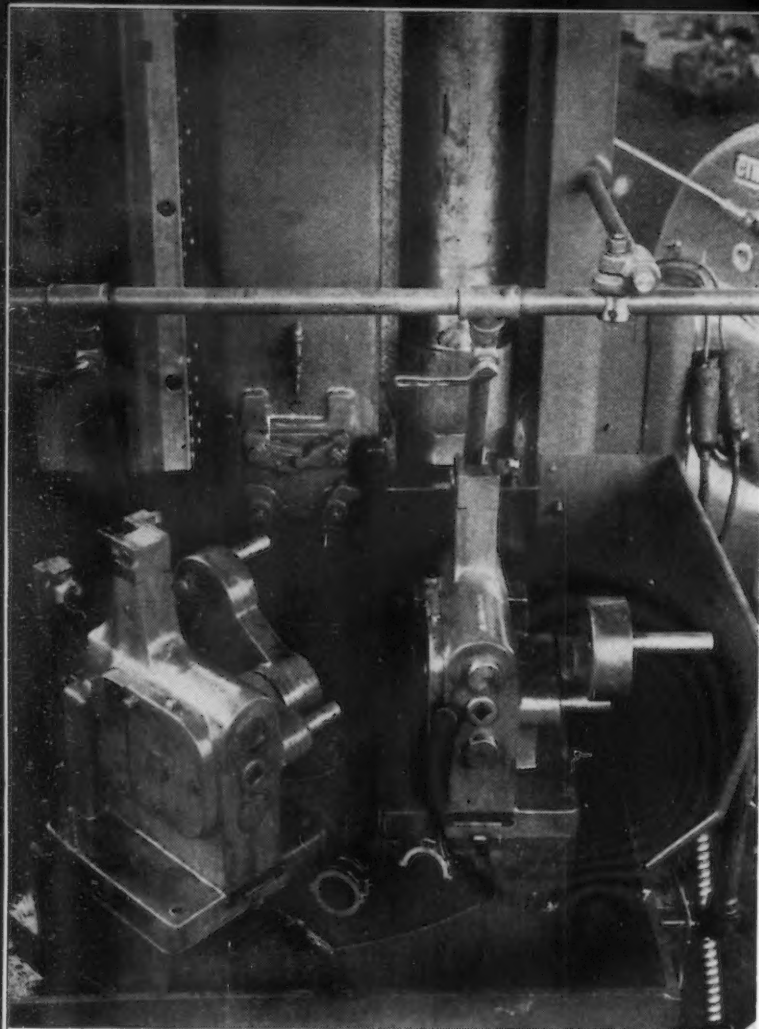
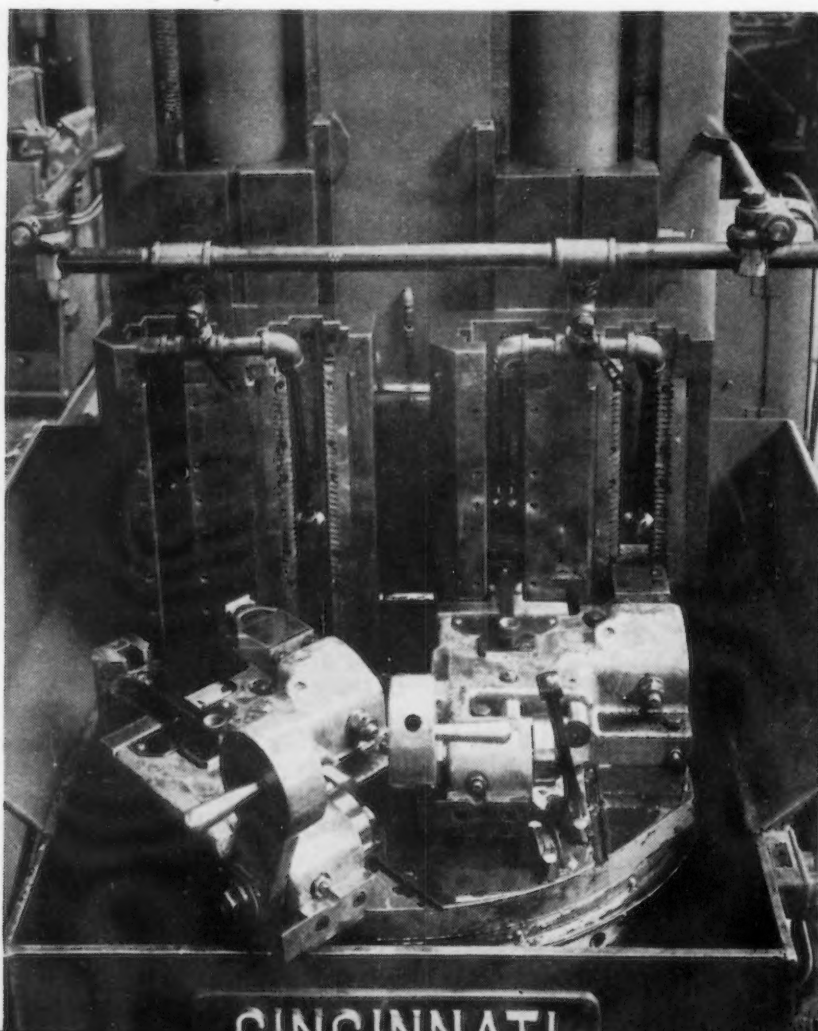


FIG. 1—Set-up for finishing the side or crank faces of both the connecting rod and cap simultaneously.

o o o

FIG. 2—In finishing the side locating pads and bolt seats of rods and caps, production is at the rate of 450 units per 52-min. hour.

o o o



IMPROVED quality and increased production, with lower costs, have been achieved by the Dodge Brothers Corp., Detroit, division of Chrysler Corp., by the installation of five vertical broaching machines for machining connecting rods. The connecting rod is forged in two parts—cap and rod—and machined before being joined together. Output with the present set-up is 360 pairs of rods and caps per hour. The machines were furnished by the Cincinnati Milling Machine Co.

The first broaching operation is the finishing of the side or crank faces of both rod and cap simultaneously. Two special work-holding fixtures are mounted on the index table opposite the two vertical rams of the broach. Each fixture holds one rod and one cap, the work being held in place by a weighted hand-lever-actuated cam clamp. The cap rests on its parting face, with the sides to be broached in vertical plane, and is held in position by a vee-block over the bolt bosses. The rod is placed similarly on top of the cap with

the major axis inclined 30 deg. to the rear, as shown in Fig. 1.

Both rod and cap are finished in one pass of a double row of high-speed inserts upon which a generous flow of cutting lubricant is directed. With each cycle of this 5-ton machine, two pairs of rods and caps are finished, production

right angles to the other, since the bolt seat is at right angles to the locating pad (see Fig. 2). The broaching speed is 31 ft. per min., and output is at the rate of 450 units per 52-min. hour.

The third broaching operation is performed on a 10-ton machine with a 54-in. stroke. The parting

168 units per hour. The lower output as compared with the other machines is due to the longer stroke and the fact that only one pair is finished per cycle. Two of these machines are used, giving a total production of over 360 rod and cap units per hour.

Clearances on the bolt bosses of

FIG. 3—The parting face and half bore of both rod and cap are finished in two passes in the third broaching operation.



amounting to 378 pairs per 52-min. hour.

Side Locating Pads Finished in Second Operation

The next broaching operation is the finishing of the side locating pads and bolt seats of the rods and caps. Rod and cap are clamped in a horizontal position alongside each other by means of quick-acting fixtures and are finished in a single pass of a double row of high-speed inserts. Each row has two sections, each of which is at

face and half bore of both rod and cap are finished in two passes, the rod fixture being applied to the left-hand ram and the cap to the right-hand ram. The dimension from the center of the wristpin hole to that of the half bore is held by locating on a stud through the wristpin hole. Automatic clamping is employed on the rod fixture with a spring-backed roller bracket bridled around the column and engaging the hinged clamp. This is shown in Fig. 3.

Production of this machine is

the assembled rod and cap are broached on a 2-ton broaching machine with a 36-in. stroke. The work is fastened by a special eccentric clamp which operates through the crankpin hole. On the unclamped position the clamp is central with the crankpin hole to permit the work to be loaded and unloaded. The location is taken from the previously broached half round surfaces and from the drilled and reamed wristpin hole. Production is 380 pieces per 52-min. hour.

Coordinated Design and Operation Feature New Rolling Mill



THE maximum efficiency in producing high quality, close tolerance strip and sheet in widths up to 37 in. was the objective when the Carnegie-Illinois Steel Corp'n. decided to install this new 4-high 43-in. continuous hot strip mill at their McDonald plant near Youngstown, Ohio.

Design and layout was coordinated in the Carnegie-Illinois offices, the United Engineering & Foundry Co. being responsible for the design and installation of the continuous hot mill and various other companies for special pieces of equipment such as furnaces, lubricating systems, conveying and transferring, etc. The plant is designed to turn out a maximum of 30,000 tons of strip and sheet steel per month from 18-gauge to $\frac{3}{8}$ in. in thickness. This design contemplates coils up to $\frac{1}{4}$ in. thick, ranging from 180 to 300 lb. per inch of width, or in cut

IN its issue of Dec. 19, 1935,

The Iron Age presented to its readers the first general description of the new Carnegie-Illinois McDonald strip mill. We take pleasure, in this issue, in supplementing the previous article with a more detailed description of this notable installation.

sheets from 30 in. to 30 ft. in length and up to $\frac{3}{8}$ in. thick. Minimum rolling width will be 12 in., coil and sheet slitters make all widths from $4\frac{1}{2}$ in. up to the full 37 in. maximum width available.

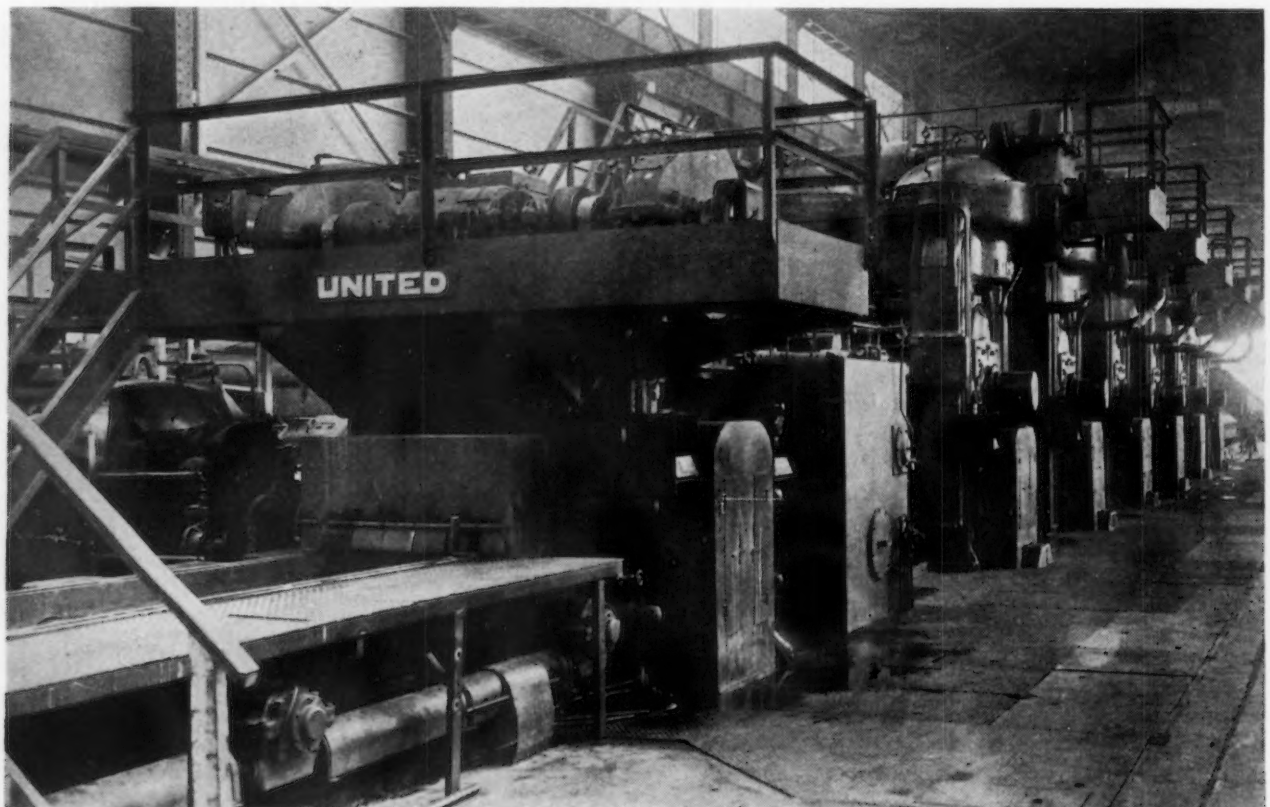
Slabs for the mill will normally be furnished from the Ohio Works of the Carnegie-Illinois Corp'n. Slabs approach the three natural gas-fired reheating furnaces over

a heavy-duty approach table. Each furnace has a hearth 18 ft. wide by 75 ft. long, with a capacity of 50 tons of heated slabs per hour.

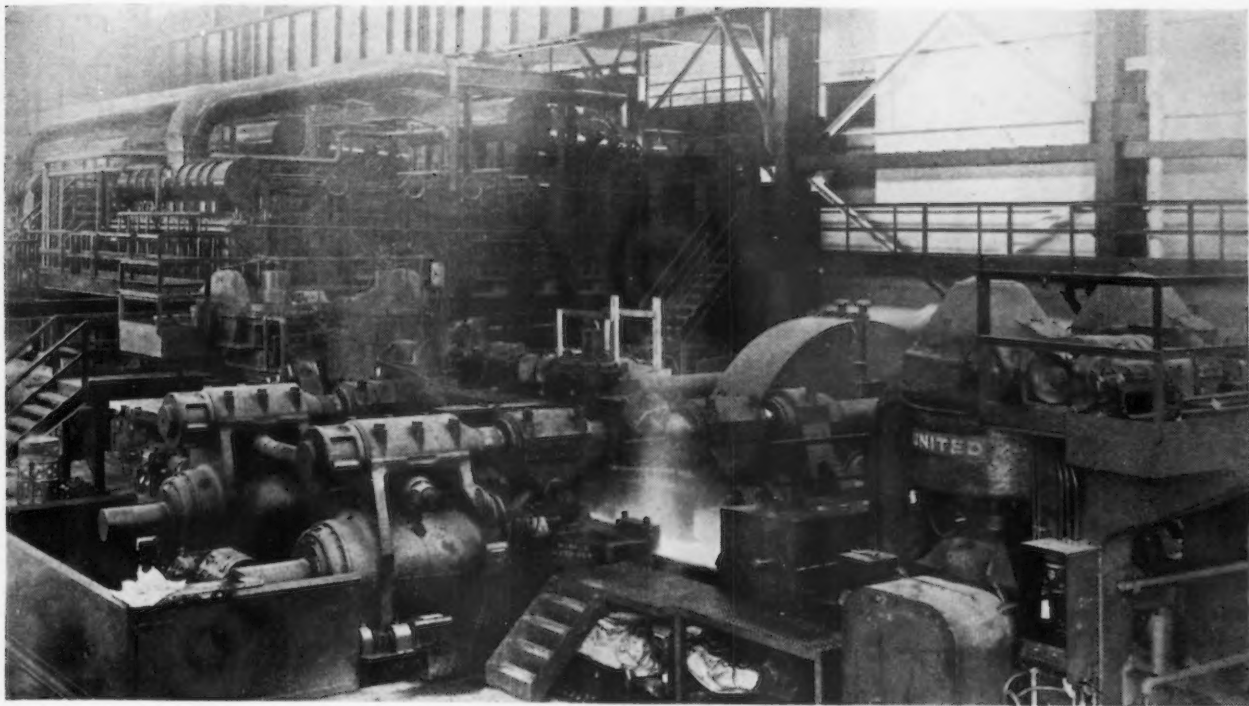
The furnace delivery table, in three sections, is 120 feet long and feeds to a 2-high 26-in. x 50-in. scale breaker driven by a 500 hp., 500 rpm. alternating current motor. Here a light pass plus the action of the roll-cooling water effectively disintegrates all furnace scale.

The slab reducer is of heavy cast steel construction with extra heavy forged tension bars, and is operated by a 700 hp. d.c. motor. It is capable of reducing the width of a slab of maximum thickness ($6\frac{1}{4}$ in.) by 3 in. at a single pass, the minimum slab width being 12 in. Side guards and screw-downs are motor operated and Selsyn transmitters and indicators are provided to facilitate setting.

On leaving the slab reducer the slab advances over a short section



Finishing train showing finishing scale breaker and flying crop shear in the foreground.

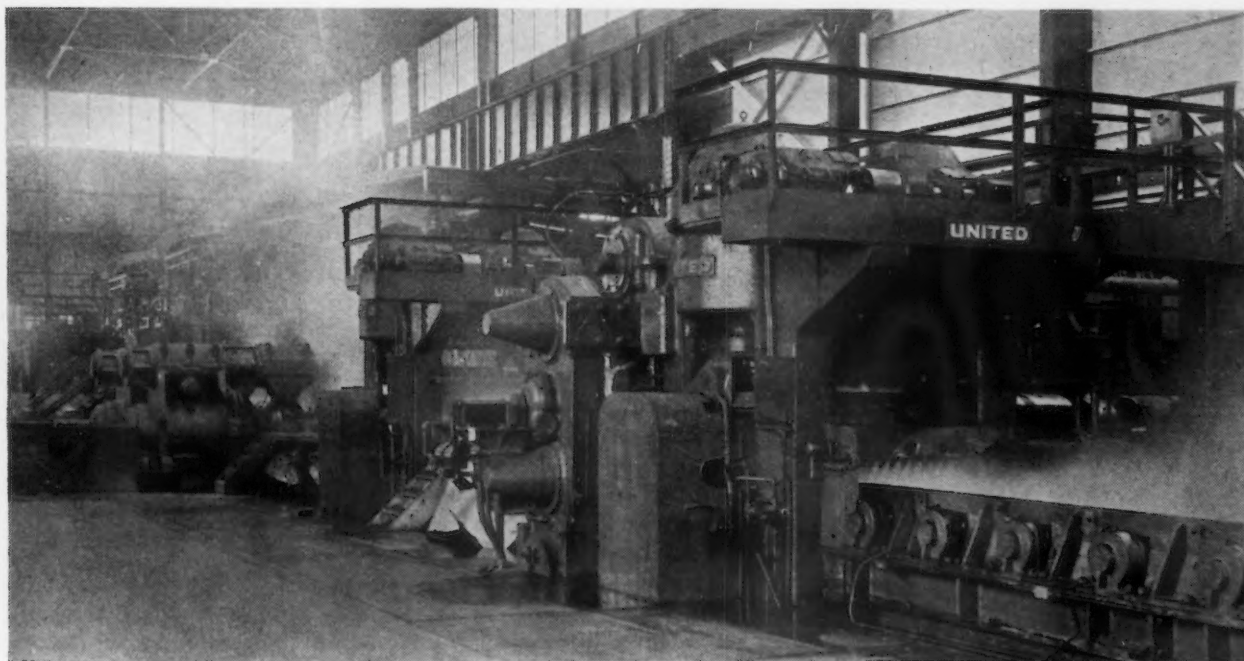
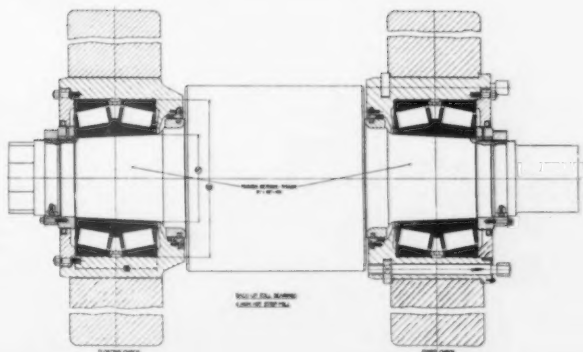


Slab Reducer at the Carnegie-Illinois McDonald Mill.

of heavy type roller table to the first of three 2-high 32-in. x 43-in. roughing stands, each equipped with 1000-lb. water jets to assure complete scale removal as the slab goes through the train. The second roughing stand, 32 ft. from the first, is preceded by a set of 24-in. edger rolls which provide the necessary edge-rolling action and control the width of the slab. The third roughing stand is spaced 54 ft. from the second and provision

(CONCLUDED ON PAGE 74)

TIMKEN Bearing and mounting used on back up roll necks in all 4 high stands in roughing and finishing trains, showing latch for locking chocks in place.



View of 2 high roughing stands (No. 1 & No. 2) with slab reducer and furnaces in the background.



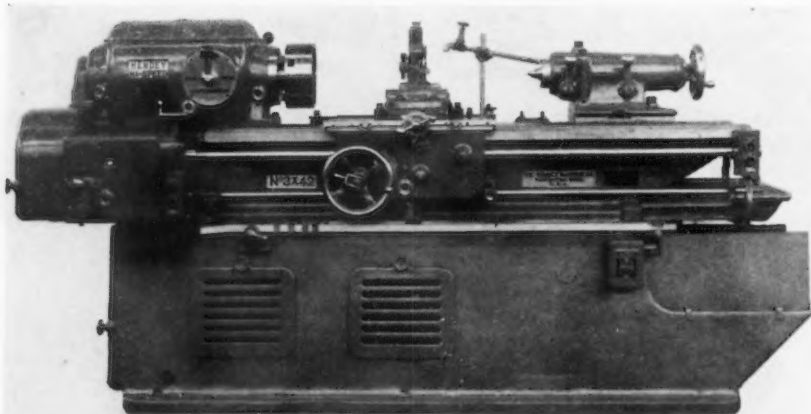
Improvements in Production

Step-Turning Lathe Design Embodies Conveniently Selective Cutting Speeds

STRAIGHT or step turning at speeds that permit the effective use of modern cutting tool materials is provided for in a new No. 3, "Hi-Speed" step-turning lathe by Hendey Machine Co., Torrington, Conn.

Power variation is supplied through the infinitely variable control of a Transitorq unit, coupled to a 10-hp. constant speed

driven through a multiple V-belt sheave running in ball bearings. The sheave is axially mounted with, but not supported by, the spindle. The head is back-gearred for the slower spindle speeds necessary for work of large diameters. Direct drive provides ample belt power for small work. The gearing is within an oil-tight compartment.



Variable control through a Transitorq unit coupled to a 10-hp. constant-speed motor, is featured in a new lathe line built by the Hendey Machine Co.

electric motor. Plate mounting for belt tension is employed.

Operation of the speed unit is through a flexible shaft having handwheel and double dial, giving spindle speed readings of 46 to 375 r.p.m., and 225 to 1350 r.p.m. Handwheel and dials are mounted at the end of the feed box, below the headstock.

Electrical equipment includes magnetic starting switch with a push button at the side of the feed box and at the other end of the bed.

The high-speed headstock is

A multi-tooth, positive clutch drives the spindle through multiple keys, hobbled from the solid. Three clutch positions provide for: left, direct drive from sheave sleeve; center, power transmission through back gear, and right, for spindle locking. The spindle is heat treated, high carbon, alloy steel, and is mounted in matched precision bearings.

A three-gear transmission with reverse gear runs in oil within an inclosed feed box. Hand crank sliding gears provide three changes of feed in a ratio of 1-2-4. Fine range is 0.001, 0.002, 0.004 in.

per revolution of spindle. Coarse range is 0.0125, 0.025, 0.050 per revolution of spindle. Transmission from spindle to gear train is by V-belts. Pick-off gears provide a wide range of feeds between fine and coarse ranges and are indicated on a plate.

The cross slide screw has five-section multiple dials for repeated tool settings at different diameters. Heavy barrel design tailstock and spindle carries a live center; standard center is fitted in a quill which runs in precision anti-friction bearings at either end, allowing center to rotate with work. The spindle is clamped by two independently operated binders to gain in alignment.

The rear of the bed has two flat finished ways for forming attachments. Taper attachment can be used. Direct motor driven pump delivers volume coolant at low pressure. An integrally cast drain, in front and at ends, returns compound to a 25-gal. tank properly screened.

Specifications call for: Swing over ways, 16½ in.; over carriage, 8½ in.; standard 6-in. flanged, type D1, spindle nose. Net weights—42 in., 5900 lb.; 54 in., 6350 lb.; 66 in., 6800 lb.; 78 in., 7250 lb.

Device for Reduction In Gas Fuel Costs

A NEW "Gasifier" unit for industrial gas-fired furnaces is a product of the Chicago Flexible Shaft Co., 5600 Roosevelt Road, Chicago. The principle involved is that of feeding oil through the device and thus producing gas. Three sizes are built and can be operated by any standard potentiometer or millivoltmeter type of control.

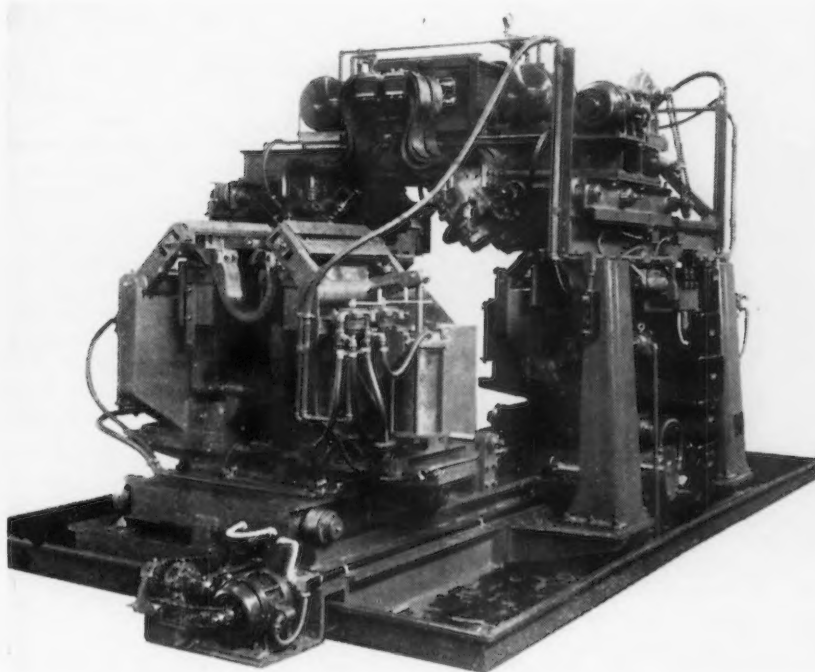
and Shop Equipment . . .



Production Welder Employs Multiple Track-Mounted Fixtures

FOR high production work in the resistance welding of two joints simultaneously in making liners for refrigerator cabinets, ovens for kitchen stoves and other box-shaped units from sheet metal, a traveling head roller seam welding machine arranged to produce two

automatically after the cycle is started the head returns to the starting position on completion of the weld. While the head is returning the fixture holding the piece that has just been welded moves backward and the second loaded fixture moves in position for



This same type roller seam welder is manufactured in a design which involves the use of a single fixture, permanently attached to the machine base.

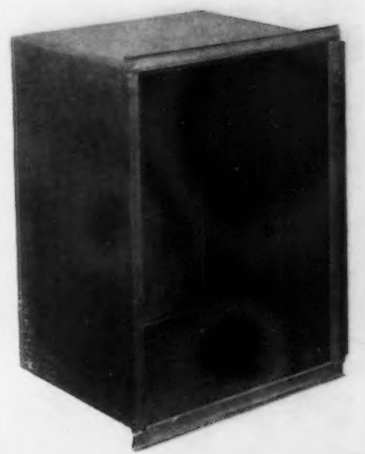
welds in series simultaneously has been brought out by the Federal Machine & Welder Co., Warren, Ohio. One model of this 225-kva. resistance welder has two fixtures mounted on a track at the base of the machine, each with an individual drive, so that while one unit is being welded the other fixture is being loaded.

As the traveling head operates

welding. Consequently there is a minimum of lost time between welding operations.

This machine, it is stated, has a capacity for welding the square ends in 45 rectangular boxes 20 in. wide and 20 in. deep per hr. With six 20-in. welds to a box, 270 welds are made, or 5400 in. of welding is done in an hour.

Welders of this type are also



being offered with only one fixture which is permanently attached to the base.

Blue Printing Machine For Moderate Needs

A MERCURY vapor tube printer for continuous blue printing of moderate requirements is announced by C. F. Pease Co., 821 North Franklin Street, Chicago. The equipment is designated as "Model 7". Its primary purpose is for reproduction of charts, tracings, diagrams, bulletins, etc., in a variety of forms, including blue-prints, brown-prints, or direct-process prints in any dimensions up to 42 in. The machine is of horizontal type with convenient feeding height. Uniform illumination is provided by an arrangement of 3½-amp., 50-in. mercury vapor tubes mounted in close proximity to the curved section of polished plate contact glass. Each tube is independently mounted and all tubes are interchangeable.* Drive is by variable speed motor. All speeds are controlled by a 28-point rheostat, conveniently located at the right-hand side of the machine.

Hydraulic Traverse Features New Semi-Automatic Spline Grinder

A NEW semi-automatic spline shaft grinder with hydraulic traverse is announced by the Fitchburg Grinding Machine Corp., Fitchburg, Mass. The wheel head column may be swiveled to a maximum of 20 deg. for either right or left-hand helical lead angle. The wheel head itself has ball-bearing spindle drive arranged for either V-belt with motor mounted on the column or integral motor drive. The elevating mechanism is mounted on top of the column and can be positioned at any angle. A two-speed hand wheel control is built in so that the graduations on the hand wheel

Indexing is by fractional hp. motor through a worm and gear friction drive to the spindle. A standard 12-key plate takes care of 12, 8, 6, 4, 3 and 2 spline shafts by means of inserts in the index notches. Other spline divisions require separate index plates. The base is cast in pyramid wall sections, ribbed proportionately inside and between the table ways. Hydraulic oil pump vibration is avoided through pump mounting on a false base which follows the contour line of the main base.

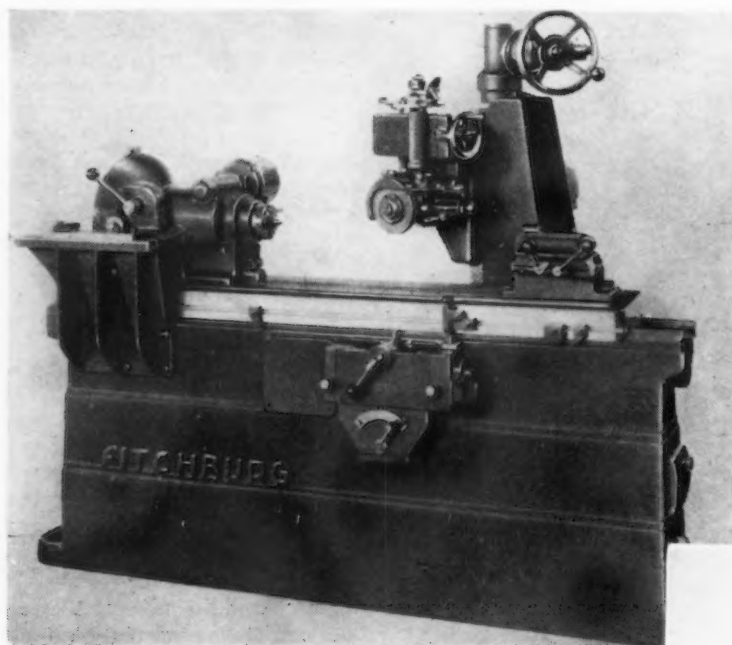
An independent pedestal locating stand provides that the operator may properly locate the driving

dog on the work piece prior to mounting between centers. A truing device attaches to the wheel head and has its own cross-slide for wheel wear adjustment.

Development in Cast Iron Die Casting

IN the die casting of cast iron, the past five years of development by Wetherill Engineering Co., Philadelphia, are said to have resulted in an improved and balanced production process applicable to practical manufacturing. The molten iron is poured into a crucible under pressure, and from there, under pressure again, forced up through a nozzle into the die or dies. When the die loading is completed the pressure is relieved and the molten metal drops back into the crucible. Thin steel die liners, supported by cast iron die frames, have been successfully used. Air cooling chambers provide the means for any desired chill or no chill at all.

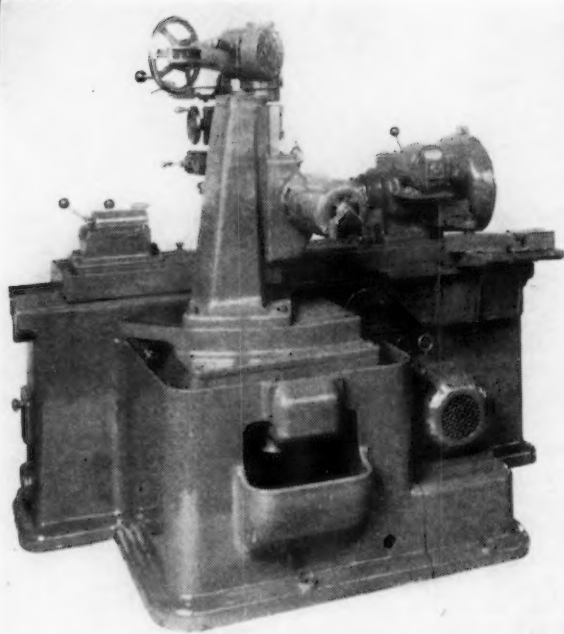
The resultant die casting is said to be extremely dense, fine grained and free from blow-holes. A collapsible metal core eliminates objections incident to the use of sand. Non-oxidized iron is said to be assured through pouring molten metal from a transfer ladle under pressure. This ladle is loaded from a rotary furnace. Either gas or oil heat is used in reaching a temperature of 3000 deg. A simple rotating device is employed both in loading and pouring. The equipment involves a number of patented features.



at slow speed show 0.001 in. and 0.002 in. at fast traverse.

The table is heavily ribbed; flood lubrication is employed for the ways and Vickers hydraulic equipment is used throughout with a two to one quick return to traverse. Headstock is available for either straight or right-hand, or left-hand helical splines or both. The helical lead is controlled by an adjustable sine bar to a maximum of 20 deg. lead angle and rotated by double preloaded rack and pinion to eliminate all backlash. The guide roll running in the sine bar is opposed by a spring-loaded ball bearing for the elimination of slide play.

o o o
The wheel-head of this spline grinder is arranged for either V-belt drive with motor on column, or integral motor drive.
o o o



Forging Presses Have High-Speed Hydraulic Clutch

AT the instigation of one of the large automobile manufacturers, in order to meet definite conditions prevailing in the forge shop, the Ajax Mfg. Co., Cleveland, has developed a hydraulic clutch applicable to its line of heavy forging machinery as an alternative for the direct pneumatic operated clutches this company has employed during the past four years.

This hydraulic clutch is of the same multiple disk friction type as the pneumatic clutch used by this company, excepting that pressure is applied to the friction surfaces by introducing hydraulic pressure instead of air pressure behind a piston that acts directly upon the clutch plates. No toggles, wedges or yokes are employed to transmit this pressure, the only operating parts aside from the piston and plates being compression springs for retracting the piston and disengaging the plates when the hydraulic pressure is relieved.

o o o
This application of hydraulic clutch operating power involves no major clutch change from the Ajax air-operated design.

o o o
A small high-speed pump, either individually motor driven or driven from the motor of the machine, supplies the hydraulic pressure, making the forging machine an entirely independent, self-contained unit.

Short piston stroke, approximately $\frac{1}{8}$ -in., and small volumetric

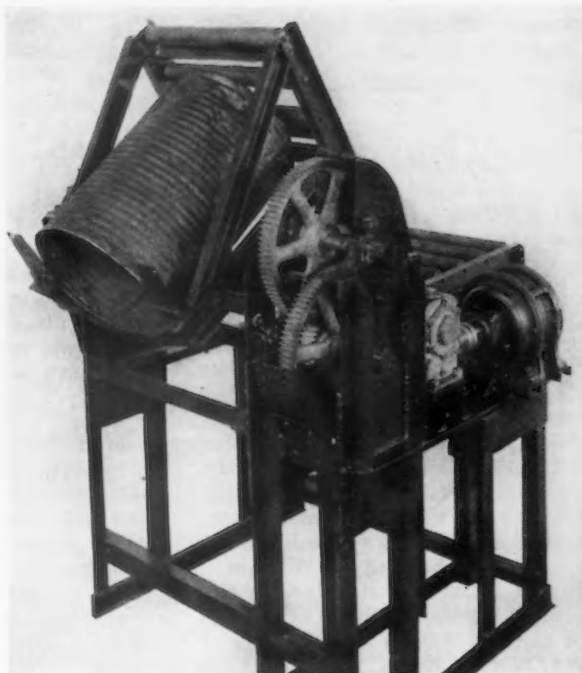
displacement result in an extremely quick action to the clutch, both in engaging and releasing. Clutch torque is controlled by the pressure setting of the hydraulic pump, and provisions have been made to prevent any leakage of oil from either the piston or the rotary connection from getting into the clutch plates or being thrown out onto the floor.



Dumping Unit for Small Parts Conveyor

THE illustrated conveyor dumping unit, by Matthews Conveyor Co., Ellwood City, Pa., is designed for 1000-lb. loads, and is utilized in the South Bend, Ind., plant of the Pittsburgh Screw & Bolt Co., Pittsburgh, where containers travel to this up-ending unit via a long line gravity conveyor. Tote cans and kegs of bolts, nuts, rivets and similar products are handled. The equipment is electrically operated and is under remote control. The routing is from annealing furnace to quench tank and from there to the up-ending unit, where the parts are dumped into whatever means of conveying is required for further distribution throughout the plant. The unit requires 6 sec. for dumping and 6 sec. for up-righting the container after dumping. The pivoted table has a platform of ball-bearing conveyor rollers and is controlled by limit switches. There is no travel when tilting the container to 45 deg. A $\frac{1}{2}$ -hp. motor with speed reducer supplies the power.

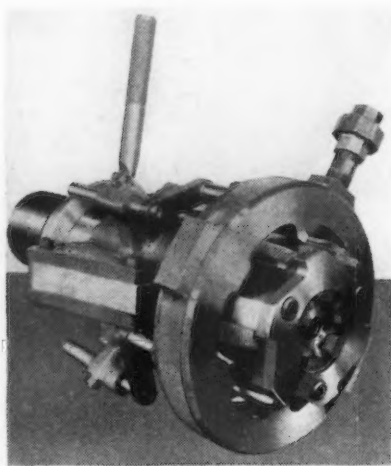
o o o
Automatic dumping of small-parts containers utilizes a separate dumping unit, set up in a conveyor system at a convenient point.



Ring Type Oil Reservoir For Collapsible Taps

AS an aid to internal threading, the Landis Machine Co., Waynesboro, Pa., has developed an oil reservoir type of trip ring for use with its style LM receding chasers and style LT collapsible tap, 6 in. and larger. The illustration is of application to a 6-in. Landis style LM receding chaser.

The ring consists of a hollow housing with steel plates mounted on the front and back, thus form-



ing a reservoir for lubricant. Smaller ring housing sizes are of cast iron and, for weight reduction, the larger ring housings are of aluminum. The front ring which contacts the work to effect the receding and collapsing action is of hardened steel. Holes are positioned diagonally in the housing to insure distribution of a forced stream of oil at points where needed.

Two Classifications In New Diesel Engines

THE Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, announces a new type R.H.B. Diesel engine. The line is divided into two classifications; one for general service use and the other direct connected for electric service use. The size range is from 100 to 800 hp. The type is stationary, four-cycle; direct injection is employed, as is pressure lubrication. Cylinder heads are designed to relieve internal strains. Cleanout covers in large water jackets are removed without disturbing inlet or exhaust manifolds. Exposure of crankcase oil to high heat is

avoided by heavy baffle plate. Trunk-type piston has head machined for air concentration. A heat-treated, die-pressed, steel-forged crankshaft, drilled for pressure lubrication, is employed.

Single Casing for New Rotary Air Compressor

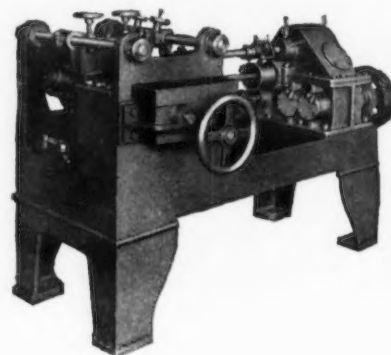
A NEW line of two-stage sliding vane rotary air compressors for pressures up to 100 lb. gage pressure, is announced by Allis-Chalmers Mfg. Co., Milwaukee. Both stages, as well as the inter-cooler, are contained in a single casing. The design is designated as "Ro-Twin" and features short length, small floor space, one stuffing box and one coupling. Allis-Chalmers "floating rings" are employed in the interest of wear reductions. Capacities range from 20 hp., 174 r.p.m., to 100 hp., 690 r.p.m., for actual air deliveries from 69 to 421 c.f.m. at 100 lb. gage pressure.

Dielectric Tester Has Increased Functions

NEW principles are said to be involved in a dielectric or breakdown tester announced by the Acme Electric & Mfg. Co., Cleveland. In addition to its function of indicating shorts, opens or grounds the device checks circuits at approved standard testing voltages. The tester will permit actual application of the standard testing voltage of double the rated voltage plus 1000 to the appliance device or equipment under test for proving the dielectric strength of the insulation to meet standard safety limits. The unit is compact and complete. A 6-ft. primary cord is plugged into a 110-volt, 60-cycle convenience outlet. Secondary connections are supplied with 4-ft. high voltage cable leads, each equipped with test prong. The secondary test voltage is manually controlled by a tap-switch which provides any voltage—500, 1000, 1250, 1500, 1750, 2000 or 2500 volts—by rotating an indicator. The short circuit current is 1 amp. at 500 volts and 200 m.a. at 2500 volts. An off and on toggle switch is conveniently mounted on the face of the device and permits full control of the primary circuit. A metal handle is provided for portability.

Continuous Automatic Straightener and Polisher

THE Medart Co., St. Louis, Mo., announces a new No. 00 continuous automatic straightening and polishing machine for wire, bars and tubular products ranging from $\frac{1}{8}$ to $\frac{3}{4}$ in. diameter. One concave and one straight face roll are employed. Work material is rotated as it advances. Straightening is effected by roll pressure which causes a flexing of the work material. Polishing is accomplished by



action of the concave roll. Gearing is entirely inclosed and runs in oil. All high-speed, high-pressure members have anti-friction bearings. Slow-speed bearings are of marine bronze.

Agitator for Use in Gritty Substances

FOR difficult mixing jobs where rigid guides for the stirrer shaft without use of a step bearing is necessary, an agitator with stepless bottom bearing and a variable pitch propeller type stirrer has been brought out by the Patterson Foundry & Machine Co., East Liverpool, Ohio. This is designated as the company's "UC" agitator.

This agitator is built particularly for handling gritty substances. The guide bearing is protected from the material by pressure type stuffing boxes. The variable pitch propeller is of the three-blade type, making it possible to vary the pitch to adjust the propeller to the viscosity and specific gravity of the material being agitated and to make the use of maximum horsepower available without overload.

Corrosion After Pickling

(CONCLUDED FROM PAGE 33)

(5) The zinc-iron alloy at the bottom of the melt did not appear until a temperature of 950 deg. F. was reached.

(6) The reducing action does not become violent until a temperature of 1100 deg. F. is reached.

(7) Five distinct phases seemed to be present, namely, (a) from the melting point through 900 deg. F., (b) from 900 deg. F. to 1100 deg. F., (c) from 1100 deg. F. to 1300 deg. F., (d) from 1300 deg. F. to 1565 deg. F., and (e) above 1565 deg. F.

(8) There were no rich segregated areas of granular zinc-iron alloy with magnetic oxide of iron.

(9) The important change, from the galvanizer's standpoint, was seen at 900 to 950 deg. F.; the point of most violent action was at 1100 deg. F.

(10) The beginning of the formation of zinc oxide was noted at 1100 deg. F.

(11) At 1565 deg. F. the melt was replaced by a dark green granular material, zinc oxide, and very fine dross crystals.

(12) The complete cycle through the various temperatures was, (a) metallic zinc, (b) the metallic zinc breaks up into small cakes with zinc-iron alloy around them, (c) formation of a richer zinc-iron alloy, (d) formation of dross crystals, (e) dross crystals begin to lose shape and change to green granular material, (f) development of dark green granular material, and (g) this material gradually becomes a lighter green and finally turns to white or yellow zinc oxide.

(13) The increase in temperature causes the development of larger dross crystals.

(14) At 1300 deg. F. zinc oxidizes very rapidly.

(15) The melt became thick and pasty at 1100 deg. F.

The application of the information found here to galvanizing is seen in the fact that the alloying action of the molten zinc and iron oxide is about 150 deg. F. higher than with the ferric oxide. This means that when the work is not thoroughly pickled the galvanizing bath temperature must be carried at a higher point, and the submer-sion time must be longer in order to break down this more resistant magnetic oxide of iron. Practical galvanizers are well aware that under such conditions, that is when the work is not fully pickled, that this is just what does happen. The bath temperature is carried higher in order to get the same production through the bath, although in many cases an inferior quality re-

sults and some of the work has to be done over because it has not been fully pickled.

Brazing New Type Tear Gas Shells

(CONCLUDED FROM PAGE 37)

loaded. Similar projectiles are being made by the copper brazing process for mortars, these projectiles being 3 in. in diameter. Other applications of electrical brazing in this field are being developed for making certain types of munitions for war purposes.

The assembly within the shell includes two small cylindrical parts with threaded holes through the center, made on screw machines. One of these is brazed to the body and the other is brazed to the booster tube. In the final assembly both booster tube, and the tail assembly are screwed to the body assembly. A stamped member that closes the outer end of the booster tube is brazed to that tube. In addition to the four copper brazing operations mentioned above, the bung of the cartridge from which the projectile is fired is brazed to the cartridge shell, the bung first being pressed into a piece of tubing that forms the cartridge shell.

The copper brazing is done at 2100 deg. Fahr. in a 20-kw. box type General Electric furnace with automatic temperature control. The furnace has a combustion type atmosphere controller which reforms a mixture of natural gas and air and which supplies a reducing atmosphere. This atmosphere serves as a flux. Rings of copper used in the brazing are formed by tightly winding wire in the joints when the parts are assembled.

The parts are handled through the furnace in wire trays 24 in. long and 11 in. wide. The charge in a tray is 28 shell bodies and noses or 75 booster tubes or 15 cartridge shells. The work is kept in the furnace 15 min., making a cycle of four trays per hr. Leaving the furnace the brazed parts pass into a water jacketed cooling chamber where they remain an

hour during which their temperature is reduced to 200 deg.

The brazed joints in the projectile shell are absolutely tight and the shell has withstood hydrostatic pressure of over 3000 lb. per sq. in. In one test the shell gave way under a pressure of 3300 lb. but the copper brazed joints remained sound.

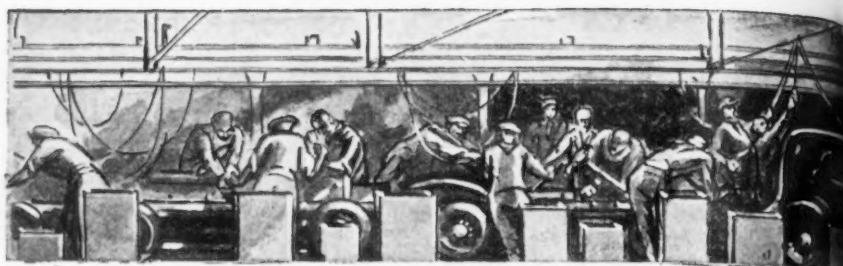
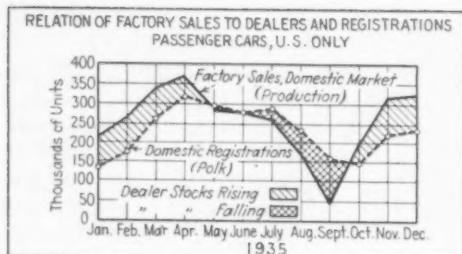
Acme Uses Modified "Laboratory" Slab Furnace

(CONCLUDED FROM PAGE 39)

were not marred by skid pipe spots.

Even after these alterations, the characteristics of the old and new furnaces were still too far apart. Therefore, early in 1934, furnaces Nos. 1 and 2 were rebuilt to make use of the "laboratory" type of furnace. For about a year and a half all essential features of design on the three furnaces have been alike. The only major difference is that in furnace No. 3 the waste gas downtake is at the extreme end of the furnace, whereas on No. 1 and No. 2 the connections were left as in the original design, that is about 5 ft. from the end.

Many of the operating records now being established are of interest. In the first place, these data show that coal per ton of product steadily declined from the time the first laboratory type of furnace was installed and through the successive modifications to the three furnaces. The fuel consumption (including stand by losses) is now averaging less than 190 lb. of coal gasified in the producers per ton of slabs heated. Hearth troubles are now the lowest on record with the Acme Steel Co. The dry skids give an average service of eight months, and they have on occasion attained a peak life of 11 months. Side walls and roof repairs have dropped far below the cost of maintenance during the period when high-spot furnace temperatures caused the fire brick to run. Slabs no longer wash, nor do they stick irrespective of uncontrollable irregularity of mill operation. The three furnaces as now constructed offer satisfactory flexibility.



THIS WEEK ON THE

Bad Weather Impedes Sales, Delays Shipments of Cars

DETROIT, Feb. 18.

"WINTER Throttles Wide Area with Fingers of Ice." So read the headlines, and so once more the weather becomes the chief topic of conversation. Old Man Winter has been taking a mean advantage of most of the population of the United States in the last few weeks. Here in Detroit, the situation is like hitting a man when he is down. We were willing to concede in these columns last week that the low point in production had been reached the week before and, in fact, Cram's estimates of last week's production showed a small but noteworthy increase over the preceding one. Production is wavering this week and may go in either direction. Extreme cold, alternated by snow storms, thaws and a freeze-up, has produced traffic conditions in the city that have the Commissioner of Public Works appealing to the citizens for a bright idea on how to rid the streets of an inch of ice. Outstate, drifts block the roads and have reduced the amount of cars leaving the factories by haul-aways almost to zero.

In fact, because of adverse road conditions, a new factor has entered the situation, in that insurance underwriters refused to handle any business on haul-aways and even drive-aways during the past

week. Companies like Ford and Plymouth ship a great deal of their output by these means. Last Friday the assembly line of the Ford Motor Co. came to a standstill, to end a four-day week, solely, it is said, because the cars could not be moved out of the plant and there was no room to store them. In one of the Mid-West assembly plants another assembly line was brought to a halt largely because of material shortages. The weather has also had a very adverse effect on freight movements, so that the question of transportation at present even overshadows the problem of new car and used car sales.

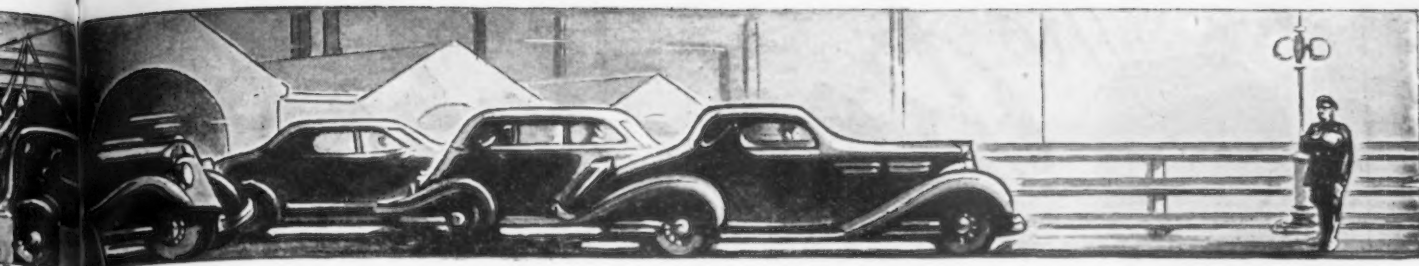
Here in Wayne County the used car situation has gone from bad to worse in the last few weeks. Inventories of used car stocks have risen from an average of 50 per cent above normal to 75 per cent above normal. A number of dealers are refusing to accept trade-ins on new car purchases, simply because they cannot afford to have further cash tied up in used car inventories. With conditions as they are, and dealers fighting for what little business there is in stormy weather, trade malpractices have come back, after being practically outlawed under the NRA dealer code. Used car dealers have been guilty of bootlegging new cars from legitimate dealers and selling them at other points substantially below

f.o.b. factory prices plus delivery and service charges.

Lo, the Poor Dealer!

As a result of the squeeze between the finance companies on the one hand and frozen cash in more frozen used cars on the other, at least a half-dozen dealers in Wayne County have gone to the wall since the first of the month. In the face of a situation of this kind, it hardly seems likely that the dealers will be able to put across the program recently proposed at their New Orleans meeting to assure a 20 per cent profit on the turnover of used cars. Instead, it would seem that their first objective would be to win closer cooperation on the part of the manufacturer in the sharing of some of the risks of the retail end of the business. Under the present set-up, the dealer is holding the bag. The car manufacturer gets his money as soon as the insurance company takes over title to the car when it leaves the factory.

The chart in the upper left-hand corner gives a fairly good picture of the present situation as regards the stock of new cars on dealers' hands. As can be seen, since about the first of October domestic sales of passenger cars to dealers have exceeded domestic registrations of the same type of vehicles. This trend will be continued in January,



ASSEMBLY LINE

By FRANK J. OLIVER

Detroit Editor, *The Iron Age*

as estimated production (factory sales) is 350,000 units, whereas Polk's present estimate (revised) of January registrations is 220,000 units.

Another sidelight on the same situation is seen in comparative sales figures for General Motors cars in December and January, as follows:

	Dealer Sales	Consumer Sales
December	150,010	122,198
January	131,134	102,034

The ratio of dealer sales to consumer sales was 1.21 in December and 1.29 in January, indicating a relative rise in dealer stocks. For Chevrolet alone, the ratio in January was 1.38.

Chevrolet, by the way, is doing an outstanding job in assisting its dealer organization on used car sales. Figures for the last quarter of 1935 indicate that 400,717 used cars were sold, as against 247,666 new cars, a ratio of 1.62 to 1. For January, the corresponding figures were 166,966 used cars as against 75,412 new cars, making a ratio of 2.25 to 1. For the industry as a whole, a ratio of 1.75 to 1 is considered normal. During the past week, it is understood that in Wayne County the ratio went under 1 to 1, indicating a very serious slowing-up in used car sales. The Chevrolet figures, of course, reflect activity throughout the United States.

Production Schedules Uncertain

Schedules for the present week and for the remainder of the month are very uncertain at present. During the past week, revisions have been the order of the day. A schedule made on Friday may not be adhered to on the following Monday. With present weather conditions, it is almost impossible to predict what the present trend will be. Men who have been fol-

lowing weather reports during the last month conclude that we are in for severe winter weather for at least another thirty days, owing to the large amount of snow and ice spread over the greater part of the country and into regions far south of the usual frost line. Northwest winds swooping down from Canada and over the glaciated western and mid-western states have been able greatly to overbalance any moderate winds coming in from the tropics, creating the present condition of one-day thaws followed by zero freezes, as the conflicting air currents battle for supremacy.

While the industry is extremely optimistic as to spring buying, even the most bullish sales manager will have to admit that a spurt in sales will not take place on any grand scale until moderate weather is with us in earnest.

Airplane manufacturers have recognized the importance of weather as a factor in manufacturing operations during the past year. As a result, we have seen many such move their plants from windy cities like Buffalo to the pleasant climate of California. Only very large manufacturers like the Glenn L. Martin Co. in Baltimore have found it necessary to stick by their expensive and modern plants in the East. Fortunately for Detroit, the motor car industry is too firmly anchored to see a general exodus of car manufacturers to California or Florida during the coming year. Planes cannot be tested in 40-mile-an-hour gales and zero temperatures, nor can experimental cars be run around proving grounds in snow drifts three feet deep.

Machinery Market Quiet

Machinery people still look to the automotive industry as an exceedingly active market in 1936. Closures, however, have been slow

in the last week. Business that was expected to break, simply has not come through. The main plant of Chevrolet in Flint has been actively in the market and there is talk of Oldsmobile purchasing machinery, mostly for replacement. Buick has about cleaned up its tremendous replacement program extending back six months. Chrysler's East Jefferson Avenue plant has been asking for proposals and it is expected that a good percentage of these will develop into orders before very long.

The departure of two of Ford Motor Co. engineers for Germany indicates the expansion of activity at the Cologne plant. Under the present Nazi regime, imports of American machinery are practically barred, since money cannot leave the country, so that both a purchasing man and a machine tool expert are in the party that left for abroad. A number of American manufacturers, however, have supplied machinery for the Ford Motor plants in both England and France during recent months for the production of a small V-8 engine.

Steel Price Structure May Change

Steel sales during the past week have reflected the general condition of automotive production. Commitments ahead are in very small volume and deliveries on past orders have been extended from week to week. Companies like Chrysler that buy on blanket order have been in more favorable positions, but have created a great deal of uncertainty in week-to-week deliveries of steel.

A bright factor in the local steel situation, however, is the fact that general manufacturers are entering the market in much greater volume than was the case at this time last year. The refrigeration manufacturers have been taking up a good deal of the slack in sheet



The Red Tape
SHACKLES OF INDUSTRY
Symbolize
LOST TIME AND EFFORT

INEFFICIENT OVERWORKED
 MACHINERY IS THE RED TAPE
 BINDING INDUSTRY'S
PROFITS

Throw off these Shackles

The first Step is a Special Effort to know the Productive Possibilities and Values of Bullard Type "J" Multi-Au-Matic.

Replacement of overworked Equipment with this manufacturing unit provides:

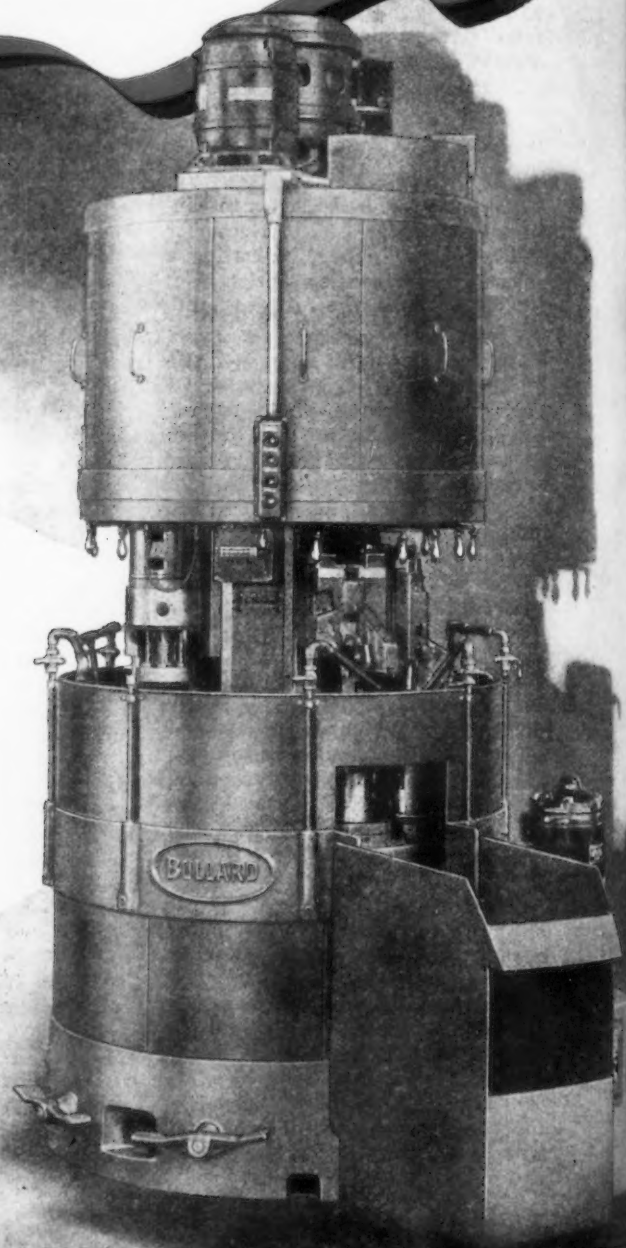
Seven complete operations simultaneous with removal of one finished piece and rechucking of one rough piece.

Quick change-over from Single to Double Index, thereby providing First and Second Chucking on the same machine where each chucking may be accomplished at three stations. (Bullard Patented.)

Individual Speeds and Feeds at any station to meet requirements of individual operations.

Adequate range of Feeds and Speeds for the low and high ranges required on varied classes of work.

Flexibility of Operation and Control due to combined mechanical and electrical functions.



ADVISE BULLARD OF

YOUR SPECIFIC NEEDS

AND LET US FURNISH

ENGINEERING ESTIMATES

CALCULATED TO

INCREASE SAVINGS

AND PROFITS.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

mills, as have makers of steel furniture, filing cabinets and other pressed steel equipment.

With prices of steel scrap mounting rapidly, there is talk now among the steel people of getting back from the automobile manufacturers the \$3 a ton concession granted on certain categories during the latter part of 1935. When second-quarter contracts are up, the question will probably be reopened. For one thing, the steel makers look rather enviously at the handsome profit statements of the motor car builders, as they contemplate the meager profits for the steel industry as a whole.

Bus Trends

The recent trend toward the use of lighter, faster and cheaper buses is exemplified in the announcement of Detroit's Department of Street Railways that it is in the market for about \$1,250,000 worth of small buses. For the last year or two, the city has been experimenting with a light type of bus, as compared with the heavy, cumbersome ones that roll up and down the Motor City's streets. Some time ago, the D.S.R. officials conceived the idea that a bus should not cost more than \$100 a seat. Bus manufacturing companies laughed at the idea, but before long bids were obtained for 21-passenger buses at less than \$2,100 each. The D.S.R. is now buying buses of this type at about \$1,700 each.

In its own shops at Highland Park, there has recently been constructed an experimental bus body made of aluminum alloys in place of steel, having a capacity of 22 passengers and weighing 1000 lb. less than the 21-passenger light bus now in use. The D.S.R. now plans to buy or build 500 buses of this type and expects that the whole vehicle, including the chassis, should be turned out for approximately \$2,500. The new body has a sloping front and is equipped with both front and rear doors to cut loading and unloading time. A new seat arrangement provides for an aisle 13 in. wider than the present buses. Because of its light weight, it is expected that the bus will have an economy of from 9 to 10 miles to a gallon of gasoline, as compared with the 7 miles a gallon average of the present smaller bus and the much poorer economy of the old-style heavy buses. While D.S.R. officials have said that there is no reason why the Department should not go into the business of making its own bus bodies, it is known that such a manufacturing project will be dropped if private manufacturers will turn out this body at the right price.

Lake Superior Iron Ore Water Shipments Were 28,500,000 Tons in 1935

TOTAL shipments of iron ore from the Lake Superior district in 1935 amounted to 28,503,501 tons gross, according to the annual report of the Lake Superior Iron Ore Association. This compares with total shipments of 22,063,824 tons in 1934. The all rail movement last year was 144,692 tons, as against 60,444 tons during the previous year.

The amount of ore beneficiated last year increased in somewhat greater percentage than the increase in total shipments. The total concentrated was 5,011,605 tons as against 3,440,041 tons during the previous year and the total beneficiated last year was 7,150,119 tons as against 5,584,975 tons during the previous year. Jigged concentrates amounted to 838,212 tons, or more than twice the amount that was beneficiated by this method during the previous year.

The production of magnetic concentrates which was started in an experimental way during 1934 was more than doubled last year. A new ore washing plant was built by the Corrigan, McKinney Steel Co. at its St. Paul mine, but was not

placed in operation until late in the season. This now belongs to the Republic Steel Corp.

There were 124 mines in operation last year, a gain of two over the previous year. Ore was shipped from 55 Mesabi district mines, a loss of one; from 24 Menominee Range mines, a gain of three; from eight Cuyuna Range mines, a loss of one; from 19 Marquette district mines, a gain of one, and from 14 Gogebic and from four Vermilion Range mines, the same number that were active in the previous year.

The Hartley-Burt mine, a Steel Corporation mine in the Mesabi district, for the fourth consecutive year led in the production of ore, shipping 2,107,643 tons. The Hill Annex mine in the same district, a Jones & Laughlin property, held second place shipping 1,720,962 tons and nosing out the Adams-Spruce group, Steel Corporation property, which held second place the previous year and produced 1,719,511 tons last year. The Hill Annex mine had previously been well down in the list, its output in 1934 having been 496,804 tons.

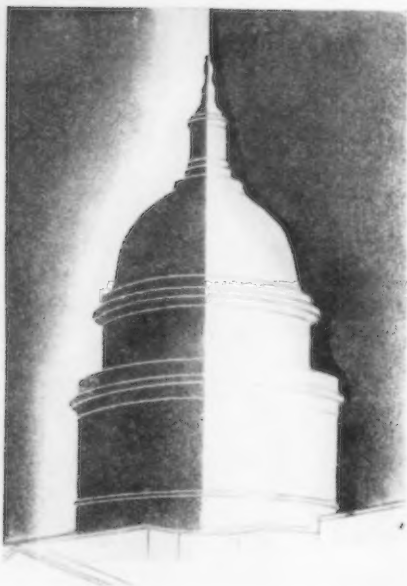
Shipments of Lake Superior Iron Ore by Ranges
(Gross Tons)

Range	To Upper Lake Ports	All Rail	Total 1935	Total 1934
Mesabi	18,857,978	19,559	18,877,537	14,650,099
Marquette	3,150,169	115,368	3,265,537	2,473,847
Gogebic	3,068,887	1,938	3,070,825	2,287,131
Menominee	1,633,880	142	1,634,022	1,335,027
Vermilion	851,290	5,809	857,099	785,149
Cuyuna	796,605	1,876	798,481	532,571
Grand total.....	28,358,809	*144,692	28,503,501	22,063,824

*Includes 181 tons lost in transit.

Shipments of Beneficiated Ore in 1935 by Methods

Method of Beneficiation	Minnesota	Michigan and Wisconsin	Total
Washed	3,621,524	.....	3,621,524
Jigged	838,212	.....	838,212
Magnetic	11,143	.....	11,143
Sintered	266,854	.....	266,854
Sinter-Dried	44,532	.....	44,532
Dried	229,340	.....	229,340
Total concentrated..	5,011,605	.....	5,011,605
Crushed and/or screened	2,138,514	2,990,663	5,129,177
Total beneficiated...	7,150,119	2,990,663	10,140,782



THIS WEEK IN WASHINGTON

Prospective legislation by present Congress is expected to have vote-getting virtues.

• • •

"Chain store bill," designed to protect the corner grocery, will probably be approved by the Senate.

• • •

Sales of automatic stokers are likely to be improved by FHA financing.

• • •

NRA studies on price and production control offer an excellent opportunity for further Government interference.

• • •

New Deal is expected to allow Supreme Court to continue now that the TVA decision is on the books — But it was a narrow escape for the defenseless jurists!

BY L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

• • •

WASHINGTON, Feb. 18—Predicting what Congress will do is always a hazardous undertaking, which is a generality, but not, it is hoped, a "cowardly generality," of the type President Roosevelt mentioned in his Jackson dinner broadcast. . . . For, broadly, Congress will jam through legislation which it thinks is most popular and therefore enhance its chances for reelection. . . . This is particularly true of a campaign year, as the present year happens to be. . . . Unfortunately the meritorious character of legislation is too often only of secondary consideration for a large cross section of the law-making body. . . . Unfortunately, too, the noisy and organized minority dictates to Congress because the unorganized majority is silent or apathetic—or both. . . .

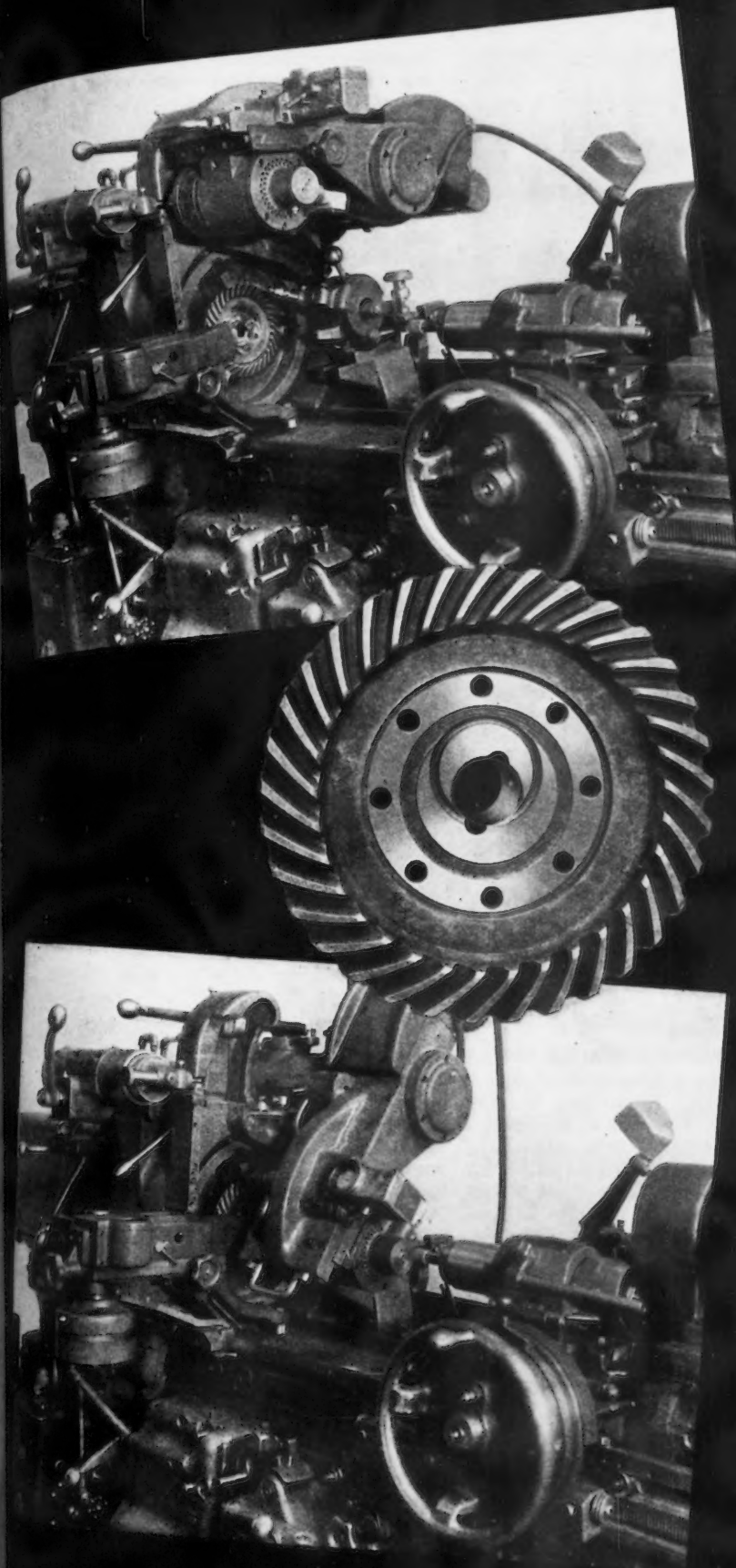
Though it is agreeably realized that the present Congress has some high-minded members, it is also disagreeably realized that as a whole it is especially susceptible to group pressure. . . . Examples: The veterans' lobby and the agricultural lobby. . . . In the face of a record Treasury deficit, the former jams through a cash payment bonus by an overwhelming vote, as a result of which members of Congress who supported this measure to throw a further enormous burden on taxpayers expect to cash in on votes for reelection. . . . Also

as a result of which many voted bonuses for themselves; then, seeking to eat their cake and still have it, and, again with votes in mind, they hedge on taxation legislation to pay the bonus, postponing until after election the inevitable and evil day when that will have to be done. . . . The White House, which made a gesture toward immediate bonus taxation, appears to have renegeed on the issue and adopted the manana policy, as though hoping for political manna meanwhile. . . .

Heedless of warnings even from some of the most ardent supporters of legislative pap for the farmers that it is just as wide open to attack as to its constitutionality as was the AAA, New Dealers insist on putting through another agricultural bill palpably intended to play to the agricultural vote. . . . It means nothing to them that it is class legislation, that it shunts another mere \$500,000,000 on the urban population, nor that the con-

tinuance of benefit payments to farmers will not assist the great bulk of farmers who probably know little or nothing about the legislation, and would be opposed to it if they did understand it. . . . But again the majority remains inarticulate while the organized minority threatens and demonstrates and pulls the old saw about a march on Washington—"the biggest one ever staged"—if demands are not met instantly, which, outside of political circles, increases the depth of Washington ennui. . . . For sartorial reasons, the "march" ought to be encouraged. . . . Then Washington again would see what the well-dressed gentleman wears and how he manicures, just as it saw when the group of Administration-invited farmers moved into Washington last year and lobbied for its legislative program. . . . They looked like a fashion parade, with not a callous in a carload. . . .

The new agricultural legislation also has the advantage of being a



Here is a HEALD especially arranged to handle a differential gear in which the hole, recess and face are all ground at one setting. The hole is ground and automatically sized Gage-Matically. The operator then lowers a special grinding unit, grinds the recess and face, dials indicating the size on these operations.

TAILOR MADE FOR THE JOB

IN addition to hundreds of Heald standard grinding machines now operating in various automobile plants on the regular run of work, there are also many Heald's that have been built especially for a particular application. These manufacturers have taken advantage of Heald engineering service, accepting suggestions for special units and arrangements that have made possible the obtaining of their requirements in production, quality and economy of manufacture.

Heald engineers are available to all manufacturers who have precision grinding or boring. They are thoroughly familiar with both these lines and can give unbiased recommendations as to the proper equipment to get the most efficient results.

THE HEALD MACHINE COMPANY
Worcester, Mass., U. S. A.

vehicle to load the Congressional Record with a lot of campaign piffle directed against the Supreme Court. . . . The voluminous verbal rat-tat against the high judicial tribunal reaches its greatest intensity when it is attacked for its decision killing AAA. . . . Many of the Congressional assailants have overruled the Supreme Court on that decision, thinking that for purposes of home consumption this form of contempt for the court goes over big. . . . All sorts of Supreme Court curbs are being proposed. . . . The power of this judicial "oligarchy" to pass on the constitutionality of laws is to be taken away from it—and left to Congress for the sake of dear public. . . . Congress thus is to be the lawmaker, the White House permitting, and the judge of its own laws and the Supreme Court is to become a mere judicial puppet; or again, the Supreme Court's decisions won't be permitted to stand unless they are unanimous, voted by more than two-thirds majority, etc., etc. . . . Since such a system is suggested for the Supreme Court, why would it not be equally applicable to Congress? . . . The bet is made that much of the tirade against the Supreme Court has only increased the always high esteem in which the country holds it, and much of the tirade is just that, a tirade. . . . Many of those who are spouting know it is safe to do so inasmuch as nothing will be done with their suggestions, so they can continue their demagogic ravings. . . . Again, it may be said, there is an orderly way for constitutional amendments—and those sincerely favorable to such amendments are the ones who are advocating that the orderly plan be adopted. . . .

They are opposed to the cheap cant aimed at the Supreme Court. . . . Knowing American history, too, they are aware that pathetic attempts are being made to draw an analogy between criticisms of the Supreme Court by such statesmen as Jefferson and Lincoln and later statesmen, on the one hand, and some of the present-day critics. . . . It will be noted that the prominent critics of bygone days did not stoop to vulgarity, nor were efforts made to resort to subterfuge to evade Supreme Court decisions. Moreover, as it happens, these statesmen were also staunch supporters of the Supreme Court. . . . Shocked as he was by the Dred Scott decision, Lincoln said he would not resist it. . . . He couldn't understand why a slave once he reached a free state was still a slave and yet Lincoln respected the court and the decision was rendered null and void only by war. . . .

But, of course, it is to be kept in mind that much of the spouting of Congress is just political boondoggling, which is a ragged way to repay the Supreme Court for being the greatest source of recovery by reason of its decisions, beginning with its welcome slaughter of the Blue Eagle.

Congress was eager to put through bonus legislation and it is equally as eager to put through farm legislation. . . . Aside from that appropriation and national defense legislation, it will content itself largely with marking time now, hoping to adjourn May 1, after which it will hie itself to the political hustings. . . . Meanwhile of course it has a plethora of legislative bills, some of which are designed to give business the jitters and make confusion worse confounded, if possible. . . .

So, getting back to the dangers of prophecy, it is predicted that such measures as the Black-Connery 30-hr. bill, the Walsh bill, to compel contractors on Government work to adhere to code hours and wages; the O'Mahoney bill, to license manufacturers, and the Rayburn-Wheeler bill, authorizing the Federal Trade Commission to prohibit "deceptive practices" will not be enacted. . . . The Patman-Robinson bill, to amend Section 2 of the Clayton act, concerning discriminatory prices, recently reported out by the Senate Judiciary Committee, apparently stands a chance of passage, though some think it will get tied up in the House Committee on Judiciary. . . .

Hearings, however, are to be held soon on the bill to license manufacturers and its author, Senator O'Mahoney, through radio broadcasts and otherwise, is seeking to develop support for its passage. . . . Like the Black-Connery and Walsh bills, it has the support of organized labor. . . . The Wheeler-Rayburn bill would give the Federal Trade Commission extremely broad powers over business. . . . The Commission could be its own judge of what constitutes "deceptive practices" and prohibit them through "cease and desist" orders, and it is altogether conceivable that the basing point system in the iron and steel industry would accordingly come under the Commission's ban. . . . It is not believed, however, that this bill will get anywhere at the present session of Congress, if ever. . . . The "discriminatory price" bill also would give the FTC broad powers. . . . Dealing with such matters as quantity discounts, discrimination between buyers, etc., the measure is supposed to be directed chiefly against chain stores and there is a division within business and industry as to its

merits. . . . It is extremely broad and so complex that even some of the best trained legal minds confess they do not understand it thoroughly. . . . There are those who think it is so far reaching that it could for instance through its required plan for determining costs fix price f.o.b. point of production. . . . They also insist it is too narrow in prohibiting discriminatory prices based on quantity and quality production. . . . The bill is the outgrowth of the old measure offered by Representative Patman of Texas. . . . Recently Representative Utterbach of Iowa offered a substitute for the Patman bill and hearings were held on the Utterbach bill before a subcommittee of the House Committee on Judiciary. . . . Mr. Utterbach was the chairman of the subcommittee. . . . Out of these hearings has come the Patman-Robinson bill, fathered in the Senate by Senator Robinson, majority leader. . . . The Senate Judiciary Committee did the unusual thing of reporting out the measure without holding hearings. . . . It defended its action on the ground that it had the benefit of hearings before the House subcommittee and also had before it data gathered from the chain store investigation of last year in charge of Mr. Patman. . . . It is the belief that the bill will pass the Senate but may be held up in the House Committee on Judiciary; however, it is the view that if the House committee reports the bill out it will pass the House. . . .

Lest it be forgotten that it is still functioning under the direction of the tenacious Maj. George L. Berry, attention is drawn to the fact that the Council for Industrial Progress is slated for another meeting in Washington late this month. . . . Industry Coordinator Berry refused to admit that his scheme for coordinating industry and labor and bringing the country to recovery pronto had been flattened out when the great body of industrialists walked out on him last December as the organizing meeting became disorganized and ended in an uproar. . . . He proceeded with a skeleton set-up and established the Council, of which little has been heard, made up equally of representatives of organized labor and representatives of relatively small industries. . . . At its next meeting the Council is to receive reports and recommendations made by its seven standing committees which met last week in Washington. . . . One recommendation said to have been unanimously adopted by the committee would establish an Industry-Labor "legislature." . . . According to the report it would be a permanent body inde-

pendent of Government control to formulate and recommend national policies for industry and labor, though to be "independent," it is said, the "legislature" would seek funds from the Federal Government for setting up headquarters with a staff having statistical facilities to carry on the work of the "legislature." . . . Members of the "legislature" would receive no compensation. . . . The idea of a private organization being "independent" if financed by the Government is interesting, but not possible of attainment. . . .

Buff and Polishing Wheel Industry Asks Trade Practice Rules

The Federal Trade Commission has set March 2 as the date for an oral hearing on trade practice rules proposed for the buff and polishing wheel manufacturing industry. The practices were submitted by the Buff and Polishing Wheel Manufacturers' Association, Inc., said to represent approximately 66 per cent of the total number of firms engaged in the business of manufacturing and selling buffs and polishing wheels, and 94 per cent of the total volume of sales in the industry in 1935.

Automatic Stokers Are Financed by FHA

WASHINGTON, Feb. 18.—Savings in fuel and labor made possible by the installation of automatic stokers are perhaps as important as the increased efficiency of the new steam power and heating plants which manufacturing and industrial concerns, theaters, apartments and other buildings are installing in cooperation with the modernization campaign of the Federal Housing Administration.

In some instances, according to plant, factory and building managers, the savings over a period of years will pay the entire cost of the boiler and new equipment.

A typical example is the experience of the Mid-States Gummed Paper Co., Chicago. This firm, even during the period of slack demand for its products, maintained its machinery and added new equipment as needed. The power plant was ample to operate the more efficient machines, but when better business necessitated stepping up production, it was found that the boilers had been already pushed to the limit.

Engineers recommended a new

"A.W." ROLLED STEEL FLOOR PLATE

Diamondette pattern shown actual size.



Available also in Super-Diamond, Diamond, and other patterns.

LOW FIRST COST—NO MAINTENANCE COST

Quick installation without disturbing men or production. Cut to any required shape. Slip proof, oil proof, heat proof, crack proof. Toughest traffic can't damage or impair it. PERMANENT. Immediate delivery, in various patterns to meet all requirements.

ALAN WOOD STEEL COMPANY CONSHOHOCKEN, PA.

BRANCHES:

Philadelphia, New York, Boston, Los Angeles, San Francisco, Seattle, Houston

110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE



high pressure boiler, a new smoke-stack, and an automatic stoker. The new power plant, at least 50 per cent more efficient, operates at a saving of around \$175 per week in fuel, it being possible to burn coal which costs 35 per cent less than what had been used. The new plant consumes approximately 100 tons a week.

Maintenance of steady temperature is essential for the comfort of the patrons of the Majestic

Theater, Seymour, Ind. This is being done at a saving because an automatic stoker permits the consumption of cheaper coal and less of it, according to Manager H. R. Wagner. "Since we installed an automatic stoker," he said, "we are burning a little more than half the coal we needed in other years and also are using a cheaper grade of fuel, so the savings are considerable. In addition, the stoker and regulating system permit more

even temperatures and there is less worry about keeping up the fire."

Personal comfort, and attractive surroundings made possible by the improvement of the acoustics and seats as well as general decorating of the Majestic Theater has built up attendance 25 per cent in a single year, people now coming upward of 28 miles to the theater they once passed up because of its condition.

When underwriters condemned the three boilers which provided heat and power for the Gisholt Machine Co., Madison, Wis., the F.H.A. points out, it was found that two new boilers would do the work. Because of their size, however, it was necessary to rebuild the boiler room, raising the roof some 15 feet.

"Although the new boilers are larger than the old equipment," said Fred T. Coombs, vice-president, "they are much more efficient and the installation of stokers will permit us to save an estimated \$10,000 a year in fuel and labor. In time this will cover the expense of the new plant."

The Gisholt company also was one of the first concerns to use the modernization credit plan of the F.H.A. for financing the sale of its products, metal working machinery and tools.

Air Hygiene Foundation Meets in Pittsburgh

AIR Hygiene Foundation of America, Inc., held its first annual meeting in Pittsburgh, Feb. 11, with a complete representation from its members. The foundation, which was formed in 1935 by a large group of companies from various manufacturing fields, has for its purpose the betterment of dust conditions in the industries.

At the meeting reports were made on the several phases of work of the foundation. Of particular interest were the reports of the medical committee, of which Dr. A. J. Lanza, Assistant Medical Director of the Metropolitan Life Insurance Co., is chairman; the preventive engineering committee, of which the chairman is Prof. Philip Drinker, of the Harvard School of Public Health; the legal committee, which is headed by A. C. Hirth, of Toledo, Ohio; and Mellon Institute of Industrial Research on the progress in the comprehensive basic investigation undertaken for the Foundation.

The managing director of Air Hygiene Foundation is H. B. Meller, Thackeray Avenue and O'Hara Street, Pittsburgh.

NRA Studies on Price Control Point To Eventual Federal Interference

WASHINGTON, Feb. 18. — Frequent demand for supplementary controls over costs, production, resale prices, etc., would indicate that price-filing alone is not deemed sufficient to secure effective price control in many industries.

The foregoing is one of the conclusions reached by an NRA study of price filing. It is incorporated in a summary which, along with many other summaries, has been submitted on trade practices covering the pre-code, code and the subsequent periods. The studies are to form the basis of a report being prepared by the Department of Commerce for submission to the President and Congress. Secretary of Commerce Roper has said that the purpose of the forthcoming report is to "preserve the assets of NRA."

The price-filing summary states that further and more definite findings on the economic results of price filing must await the completion of statistical case studies and the analysis of other work materials. All reports are to be completed by April 1, when NRA goes out of existence by legal limitation.

The summary on production and capacity control under NRA declared that if group action is to be undertaken in an effort to solve the major production and capacity problems with which industry has long been confronted, the Government will have to take some part, in the way, either of helping to carry through measures that it believes are desirable, or of checking others that it feels would be undesirable. Before the Government can act effectively in these respects, however, it is pointed out that it will be necessary to develop a much clearer policy as to what ends are to be desired and as to what means are practicable, than has yet been done.

Effectiveness Limited

The effectiveness of price-filing performance under NRA and the success of plans in achieving the desired ends of publicity, says the summary on price filing, were limited in many industries by difficulties arising from lack of standardization of the product by ambiguities or loopholes in the provision, by evasion of the provisions through subterfuge and otherwise, by the presence of large numbers of small enterprises and by the

fact that distributors in competition with direct sellers were not bound by the price-filing requirements.

"Administration of price-filing provisions was apparently easier and more effective in industries in which the structure of prices was simple and formalized, either prior to the code or by virtue of code provisions," according to the report.

Efforts to use price filing as an instrument of joint action to maintain prices were declared to be general. These efforts, it was stated, were not in most cases in the form of collusive agreements or overt price fixing, but in that of an organized program to restrict individual freedom in pricing practices, and to secure conformity to a predetermined price minimum or price structure.

"Thus we find relatively few recorded cases of pressure or coercive activity to require the filing of a specified net price, but very extensive evidence of efforts to compel members to abide by code or extra-code regulations concerning certain elements of price, cost floors, methods of quotation, established differentials, etc.," the report said.

"A very close relationship between cost provisions and price-filing provisions appears, with the cost provision frequently used to establish code authority control over filed prices, and vice versa. The effectiveness of this control was limited and weakened by the progressive reluctance of the NRA to approve mandatory cost accounting systems or to enforce cost restrictions.

Policy Late to Be Formulated

NRA policy on price filing was not formulated until June, 1934, when more than 300 codes had already been written. The general trend was declared to have been to surround price-filing systems with safeguards against abuse and to limit the function of these systems more definitely to effective publicity. Even as thus limited, the summary stated, the last policy statement said that they should be applied to competitive but not to semi-monopoly industries. Application of policy to effect changes, it was declared, was greatly handicapped by the reluctance of industries to open up the plans to revision.

"There was a conspicuous ab-

sence of administrative investigation of the need for proposed price filing plans at the time of their introduction and a corresponding lack of current supervision or observation of their operation and results after approval," it was declared.

"One result of this spasmodic supervision was the absence in NRA files of any body of collected price filing sufficient to permit a statistical analysis of the primary economic results on price levels, price stability, uniformity, etc."

The summary on production and capacity control said that one of the principal lessons which may be drawn from code experience is the danger that is inherent in an attempt to apply broad restrictive measures to industrial conditions which are far from uniform. Reduction of machine hours to 40, it is declared, means one thing to a plant which has been operating 50-hr.; and something very different and much more disturbing to a company whose business and equipment have long been organized on the basis of 16 or 24-hr. operation. A prohibition of the introduction of new machinery may be welcome by a large concern which has equipment in excess, it was pointed out, but may impose a real handicap on a competitor who has never acquired equipment beyond that necessary to meet his orders, perhaps on a basis of double or triple shifts.

"Notwithstanding the often negative and sometimes harmful results of production controls under the codes," it was stated, "it is doubtful whether those industries that had to bear the heaviest burden in the way of increasing wages and spreading employment could have been won to cooperation with the Administration's labor program without the promise of the measure of security that production control appeared to offer. Production control also placed limitations on the ability of the more aggressive concerns in an industry—whether through wage-cutting, or through superior efficiency in operation or in securing business, to overwhelm their competitors. Such limitations on competition may well have made it easier for some of the weaker concerns in an industry to come up to the common minimum standards on hours and wages."

It was stated, however, that, without attempting to pass judgment as to whether the precise measures of control sought were warranted, the conditions that gave rise to them were frequently such as to warrant group efforts to remedy them in the interest of



10 YEARS IN ADVANCE

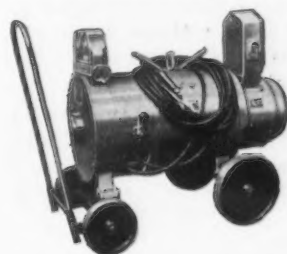
WITH EVERY FEATURE OF DESIGN AND CONSTRUCTION THAT PROVIDES MODERN ARC WELDING AT ITS BEST . . .

SINGLE, AUTOMATIC CURRENT CONTROL, FOR EXAMPLE . . .

Single, automatic current control which assures easier, faster welding, with less dependence on human skill . . . is one of many P & H Hansen Arc Welder features which provide modern arc welding at its best.

The desired welding current, best suited to the work at hand, is quickly and accurately selected on the calibration plate by the turn of a simple hand wheel, which actuates the brush shifting device.

The current selected is automatically and positively maintained by the P & H Hansen welding generator—without further attention by the operator or the manipulation of external rheostats, stabilizer, or other complicated control devices.



The compact, horizontal design of the 200, 300, and 400 ampere machines combines the advantages of maximum portability and small space requirements.



Superior electrical design provides this phenomenally simple, automatic, exact current control—available in P & H Hansen Arc Welders for more than ten years and still without equal in assuring uniform welding current under all conditions.

Efficient stabilization of the welding arc, simple excitation, wide welding range, these features, too, have long been recognized as inherent characteristics of the P & H Hansen because of its advanced electrical design.

Let a P & H Hansen man give you the complete facts on welders that are far in advance with every feature of design and construction that offers modern arc welding at its best.



HARNISCHFEGER CORPORATION
4400 W. National Ave.,
Milwaukee, Wis.

MEMO. Clip this memo and mail with your name and address on your Company letterhead to Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis., for bulletin "Weld It Well" and complete information on P & H Hansen Arc Welders.

the public, as well as in that of the industries concerned, "provided, of course, that this could be done without serious harm in other directions."

The report stated that the efforts in connection with the codes to change some of these conditions through production or capacity controls revealed many weaknesses and dangers. In addition to the hardships that tended to fall on particular members of industries,

it was pointed out, the NRA never developed a sufficiently fundamental and comprehensive policy as to what it was attempted to accomplish. There was a tendency, it was declared, to protect existing interests without giving sufficient consideration to whether the long-run national interest might not warrant changes. Usually, also, it was held, the Administration did not have sufficient information as to conditions in the industries

whose production and capacity were being regulated.

On the other hand, it was declared to be important to recognize that a refusal of the Government to interest itself in production control would not have meant that activities along that line, with the dangers inevitably accompanying their possible advantages, would cease. One reason why most of the well-organized industries do not now want a continuation of NRA, it was stated, is because many members feel they have progressed far enough in the technique of production control to get along by themselves.

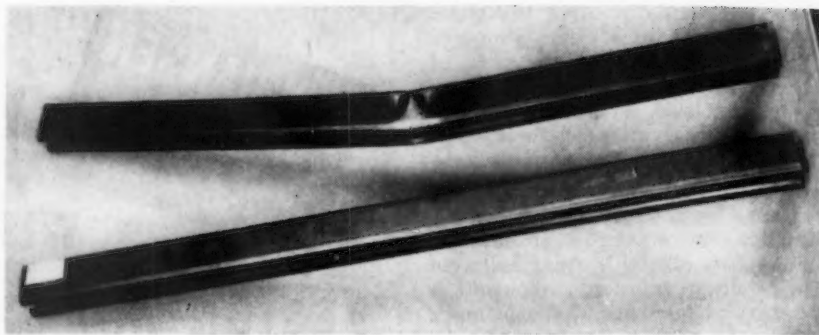
"This raises two questions," the report said. "First, how long will these industries be able to do something really effective with respect to control of production? Second, to the extent that they succeed will the public interest be sufficiently protected?"

"With reference to the first of these questions, many of those most familiar with the management of trade associations believe that industry controls will at most function only intermittently. Periods of control will probably alternate with periods of confusion. With reference to the second issue, NRA experience has showed that the unchecked administration of controls solely representative of industries are likely to give rise to actions that discriminate against some members, besides being prejudicial to the public interest."

For these reasons, the summary suggested that if group action is taken, the Government will have to take some part.

The *Industrial Washing Machine Co.*, New Brunswick, N. J., has been formed for the manufacture of washing, rinsing and drying machines for metal working industries and for cleaning pans and miscellaneous equipment in the baking industry. Ryad Sadwith, vice-president of Ross Industries, is president of new organization and is in charge of manufacturing operations. H. H. Ball, secretary, is in charge of designing and sales. Mr. Ball is known to trade through his former connections with Crescent Washing Machine Co., Hobart Co., the Metalwash Machinery Co., all manufacturers of metal cleaning equipment.

Keystone Steel & Wire Co., Peoria, Ill., has been elected to membership in the Association of National Advertisers. O. A. Brock will represent the company in the organization.



Nickel Copper Steel Permits Increased Unit Stress on Trolley Rails

AN interesting test of Yoloy, the new nickel-copper steel of the Youngstown Sheet & Tube Co., was recently made by the Coburn Trolley Track Co., Holyoke, Mass., manufacturer of trolley track.

A three-foot section of regular No. 1 track formed from 16-gage hot-rolled open-hearth steel stood up under a load of over five times its rated capacity (300 lb. on a three-foot span) and failed finally with a load of 1670 lb. The Yoloy sample made in the same gage and section, however, was loaded to 3320 lb. without appreciable failure; and, as the supporting members failed at this point of the test, further work was discontinued. The sample Yoloy track showed a permanent deflection of approximately $\frac{1}{4}$ in. in a three-foot length, as compared to the complete failure of the regular track.

Trolley track of the type manufactured by the Coburn Trolley Track Co. is overhead track used for such purposes as monorail sys-

tems, sliding doors, etc. The test was significant in that it illustrated the extent to which a steel of the Yoloy type could carry a heavier load without necessitating any increase in weight of construction.

The test indicated that the use of Yoloy may increase permissible unit stress without necessitating any change in design.

Booklet Issued On Aluminium

AN extremely handsome and well-illustrated booklet of 64 pages, entitled "Aluminum in Shopfitting and Display," has just been released in this country by Arthur Seligman & Co., Inc., 30 Rockefeller Plaza, R.C.A. Building, New York, representatives of The British Aluminium Co., Ltd., of London.

The publication discusses the scope of aluminium in modern shopfitting, its practical application in shopfitting and display, practical points on its use and fabrication and its uses in shopfitting.

Copies of this booklet may be obtained without charge from the Seligman company.

Framed Copies of Iron and Steel Process Chart Now Available

MANY readers have requested, for framing, unfolded copies of the Iron and Steel Process Chart which was published in the Annual Review Number of The Iron Age, January 2, 1936.

We are pleased to announce that through the cooperation of the author, readers may obtain the chart neatly framed in glass, at a cost of \$2.00.

Remittances may be sent direct to Stanley R. Keith, 238 Park Street, Montclair, N. J.

LaSalle Extension University, Chicago, has issued an 18-page booklet on the "Federal Social Security Act and Its Administration." It analyzes the act from the standpoint of business men and employees, giving in compact form not only the costs and benefits, but also its operation and administration. The pamphlet has been prepared by W. B. Castenholz and is available to business executives who may ask for it.

Iron and Steel Traffic on Great Lakes Leads to Remodeling Of Vessel

THE increased traffic in iron and steel products and other commodities on the Great Lakes during the past few years, requiring specially equipped boats to provide speed and economies in handling, has created a demand for larger and more efficient boats to meet the needs in this water transportation field. Special requirements of a boat in this service consist of long and wide hatches and self loading and self unloading equipment. To meet this need for improved handling facilities Oglebay, Norton & Co., Cleveland, whose interest covers the iron ore, coal and lake transportation industries, are now, through their affiliate the Columbia Transportation Co., reconstructing and re-equipping the steamer G. G. Post, a bulk freight boat with a cargo capacity of 5,800 gross tons, which was selected from the 17 vessels of the Columbia fleet as being best suited for the special requirements of the iron and steel trade.

When completed the steamer Post will be one of the largest on the Great Lakes equipped as a self-loader and self-unloader. The reconstructed boat will have three hatches, a fore and aft hatch, each 48 ft. long, and a midship hatch 80 ft. long, all with sliding steel hatch covers of new and unique design. The 80-ft. midship hatch, it is stated, will be the largest hatch available on the Great Lakes. The equipment for loading and unloading, it is stated, will be of greater capacity and greater reach than any similar equipment now in service. This will consist of two new high speed and powerful revolving steam cranes mounted on the decks of the vessel. These cranes, especially adapted for this work, will have live booms 65 ft. in length, which it is stated will make possible the handling of heavier loads at a greater speed and a greater distance from the ship's side than any similar equipment now available. These will make it possible to handle cargo for loading and unloading 45 ft. from the side of the ship. The largest standard size electric mag-

NEW DEVELOPMENTS BY STEARNS ENGINEERS IN MAGNETIC EQUIPMENT

- CONCENTRATION
- SEPARATION
- PURIFICATION
- PROTECTION
- POWER TRANSMISSION

THE TYPE "DH"

Because of its very deep, intensely concentrated magnetic field, finely ground or pulverized material—ores, clays, minerals—can be successfully refined, and magnetically reluctant particles removed with the Stearns Type DH Magnetic Separator. Operates with a magnetic drum lifting the magnetic particles, thus avoiding entrainment and keeping loss in the "tails" to a minimum. Automatic separation and discharge; has special vibrating device to provide proper feeding.

The Type DH is one of many recent developments in magnetic equipment by Stearns magnetic engineers. We maintain a fully



equipped Magnetic Research and Testing Department . . . your magnetic problem, whether separation, processing, or power transmission—magnetically—will soon find a practical solution here. Write for complete information.

MAGNETIC MFG. COMPANY
626 S. 28th St., Milwaukee, Wis.

*"Whatever Your
Magnetic Need . . .
Whatever Your
Magnetic Problem
. . . Consult Stearns
Magnetic."*

HIGH
STEARNS
DUTY
MAGNETIC EQUIPMENT

nets 65 in. in diameter will be used for handling scrap and pig iron. Clam shell buckets, of 2½-yd. capacity will be provided for handling such bulk products as sulphur, phosphate rock, stone, gravel, sand and coal. Sling equipment will be provided for the handling of long and heavy structural steel sections, rails and heavy timber.

Chartering and operation of the steamer Post has been placed in the hands of the W. E. Richey,

president Lake Ports Shipping Co., 310 South Michigan Avenue, Chicago. Mr. Richey is a pioneer in the development of large volume movement on the Great Lakes of commodities other than iron ore, coal and grain. The reconstruction and equipping of the steamer Post is being done at the Cleveland yards of the American Shipbuilding Co. The vessel will be ready for operation at the opening of the 1936 season of navigation.

Activities Bearing on Machine Tool Distribution

A Department Conducted by L. M. Waite

A very considerable satisfaction is prevalent among machine tool selling organizations because of order and inquiry conditions during the month of January, following an unusually satisfactory December. The explanation is that during December buying is generally somewhat listless in anticipation of inventory and the closing of a year. During January buying tends to remain more or less listless pending actions at annual meetings; especially is this so in connection with plants operating under absentee management.

FROM PITTSBURGH. — "Over-time seems to be the rule of sales effort during the start of the new year, just as it was during the close of the past year. This effort has developed into some very nice orders and inquiries are positively 'galore.' Perhaps it is too much to say that the 1936 volume of machine tool sales in this area will be from two to three times that of 1935, but if it is less than double I will be surprised. Manufacturers are falling far behind on deliveries, and a skilled labor shortage is definitely here. The net result is that industry is going to start bidding for deliveries, and you are acquainted with the resultant worries and confusion. Many buyers have lost their big opportunity for getting quick deliveries and low prices. It's the old story—they thought they would get deliveries whenever they might place their orders, and therefore there was no need to hurry on replacements. This district, being in the heavier goods industry, has been backward in the purchase of replacement equipment for a number of years. I do not mean that the equipment which should have been replaced will not do a job, and do it fairly well, but if labor hours mean anything in costs, either production or maintenance, Pittsburgh will do well to quit worrying about fancy trade-in deals and get its new equipment ordered. There are, of course, exceptions, for some shops have kept themselves modernly equipped, at least to an extent justified by their particular activities. With the present rate of progress in the heavier industries in this

territory it looks like three years of good machine tool business. This time may be shortened by a rush to revamp shop equipments if confidence can be given encouragement."

FROM CHICAGO. — "An unusual condition has prevailed with us in the closing of 1935. In December we sold 54 units to 28 different customers for 21 individual manufacturers. As regards 1936, it seems to us, judging from progress so far this year, that the machine tool business is going to continue its remarkable improvement. We have booked a very healthy amount of business, and, furthermore, in the amount of inquiries from people who can normally be considered as 'serious inquirers' only, there is a very reasonable certainty of continued order placements."

FROM NEW YORK AREA. — "We have started this year with order conditions much better than is usually the case in January. Increasing inquiries, covering a wide range of equipment from every conceivable kind of a shop employing machine tools, greatly encourage our tendency to predict a splendid 1936. The year of 1935, especially its close, was relatively good. We certainly hope that the past few years have given us all a sufficient number of gray hairs to

heed the fact that business is the well from which employment springs and that damming that source of supply through further 'class propaganda' is poor politics as well as rightfully questioned leadership."

FROM UPPER NEW YORK STATE AREA. — "The machine tool business is definitely on the up and up, thanks to the consistently splendid missionary work and educational effort by those steady groups which make up machine tool selling organizations."

FROM DETROIT. — "Activities in connection with the possibilities which exist for machine tool buying in this area have been so hectic for the past 90 days that most of us have had to be reintroduced to the family watch dog, so constantly have we been spreading the gospel of new and better ways of bringing down costs. Detroit will continue to do its part during the balance of 1936 in utilizing equipments for this purpose."

FOREIGN.—Orders from, shipments to, and inquiries from England during January have been pleasing to quite a number of machine manufacturers. Orders have included radial drills, upright drills, standard and special lathes and seam welding equipment. Slow delivery dates are said to be responsible for a number of the machine tool orders.

SOUTH AFRICA.—Based upon a number of January inquiries from Johannesburg, South African users of machine tools are showing a tendency to shift from European equipment to the modern products of American shops. The September machine tool show at Cleveland was a productive venture in arousing foreign interest.

OBITUARY

JOSEPH J. PETCH, stainless steel consultant in the Mid Western section for Allegheny Steel Co., died suddenly, Feb. 8, in Presbyterian Hospital, Chicago. Mr. Petch, long associated with the growth of the stainless steel business, had, before his Allegheny Steel Co. connection, been with the United Alloy Steel Co., later Central Alloy Steel Co., which in turn became a part of Republic Steel Corp., for eight years in Massillon, Ohio, before moving to Chi-

cago 12 years ago. He received his formal education at Ohio State University. He was 39 years old.

JOHN HENLEY, former vice-president of the Chicago Extruded Metals Co., died Jan. 31, at his home in Oak Park, Ill.

W. P. SIMPSON, president of the C. T. Patterson Co., mill supplies, New Orleans, died of a heart attack on Feb. 6, aged 64 years.

HARRY B. PARKER, president and general manager, Albion Malle-

able Iron Co., Albion, Mich., died suddenly Feb. 11, of pneumonia. He was widely known throughout the malleable iron industry.

♦ ♦ ♦

GEORGE B. HETHERINGTON, traffic manager of the A. O. Smith Corp., Milwaukee, since March, 1923, died of a heart attack on Feb. 7, aged 65 years. He was born in Carlisle, England, and came to America at the age of 14. From the traffic department of the Santa Fe system he went to the Rock Island lines in 1905. During the World War he handled traffic at Baltimore for the Food Administration, and afterward became traffic manager of the Armour Grain Co.

♦ ♦ ♦

FREDERIC E. WELLS, pioneer manufacturer of taps and dies, died at his home in Greenfield, Mass., on Feb. 13. Mr. Wells was born in Buckland, Mass., May 5, 1844. In 1866 he formed a partnership with his father to manufacture cutlery in Shelbourne Falls, and in 1873 went to Greenfield to become associated with the tap and die industry. Later, with his brother, F. O. Wells, he organized Wells Brothers Co., which he operated until 1916, when he retired. He made many valuable inventions in connection with taps and dies.

♦ ♦ ♦

KENNETH LEAN, superintendent of transportation, labor and shipping, Homestead, Pa., steel works, Carnegie-Illinois Steel Corp., died at his home in Munhall, Pa., on Feb. 14. He was 69 years old. A native of Scotland, he came to the United States as a young man and joined the Carnegie organization, with which he had been associated for 49 years. He was president of the Carnegie-Illinois Steel Corp. Shippers' Association.

♦ ♦ ♦

FRED WINSNES, engineer, Youngstown Sheet & Tube Co., Youngstown, died at the Youngstown Hospital on Feb. 14, aged 56 years. Previously he had been connected with the American Bridge Co. and the Hunter Construction Co. A native of Norway, Mr. Winsnes came to America 35 years ago, and to Youngstown in 1907.

♦ ♦ ♦

JOHN FRANKLIN MAGEE, who retired two years ago as secretary and treasurer of the Aluminum Goods Mfg. Co., Manitowoc and Two Rivers, Wis., after many years of service, died on Feb. 2, aged 69 years.

A South Wales steel works plans to install a giant weighbridge of 240-ton capacity for weighing railway trucks. This is the largest weighbridge ever built in England.



*Bearing, gear, bearing, gear—roll along another year.
While you're rolling merrily, watch your rolling warily—
Friction gets you bit by bit, rolling up big deficit!*

Apparently the "wheels" of your machinery may be rolling along smoothly—or at least all right, but "all right" often turns out to be very expensive in the long roll!

Lubrication has a lot to do with it. It may be over-lubrication, or the wrong grade of oil, or wrong methods of application, or other things that shoot up costs through repairs and idle machine time—and yet the correction of any of these can be very simple! In most plants lubrication costs can be substantially reduced by the Standard Oil engineer.

There's the case, for instance, in which \$12,000 per year was saved on petroleum solvents for one plant. "That'd pay my salary!" winked the plant superintendent.



A metal-working plant was reaming a tapered hole in heat-treated alloy steel of unusual hardness. Grinding burned drills was a daily routine. A Standard Oil engineer made tests and recommended a cutting oil that not only increased the life of the drills by a wide margin but also resulted in a much smoother finish of the work.



Then, there were the five public school buildings using a cylinder oil which was getting back into the boilers. It was evident to the Standard Oil engineer that the oil was too heavy for the separator to handle. Capitol Cylinder Oil did the trick!

Copr. 1936, Standard Oil Co.

Write for the booklets below which interest you or for any other information desired regarding petroleum products. Address Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago, Ill.

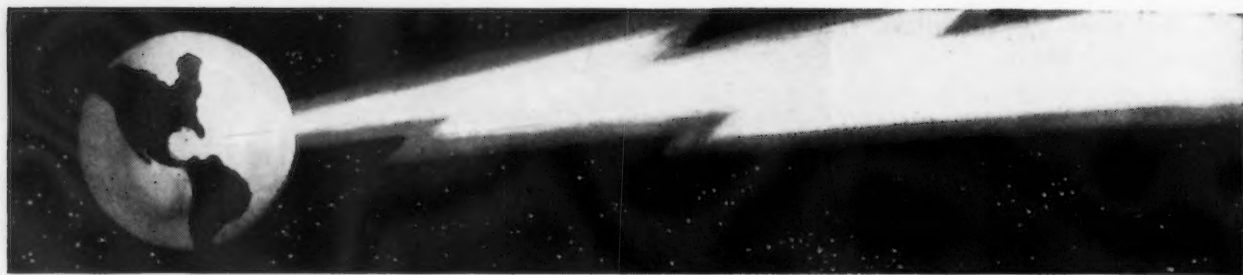
(268)

- ☐ "Lubrication in Honing & Lapping Operations"
- ☐ "The Lubrication Engineer—His Value to You"

- ☐ "Lubrication in Grinding Operations"
- ☐ "Lubrication in Gear Cutting Operations"

**STANDARD OIL COMPANY
(Indiana)**

CORRECT LUBRICATION



NEWS OF THE WEEK

Steel Output Per Family in 1935 Highest Since 1930— Still Below Normal

PRODUCTION of finished steel for use in this country in 1935 amounted to an average of 1700 lb. per family of four persons, the largest for any year since 1930, but 14 per cent below the average output per family in the first 30 years of this century, according to calculations by the American Iron and Steel Institute.

From 1900 until 1929 the production of finished steel for domestic use grew from approximately 1000 lb. per family to nearly 3000 lb.

The average for the 30-yr. period was 1980 lb. per family. In 1932 the production per family declined to 740 lb., the lowest in the twentieth century. The low rate of output per family during recent years indicates that production has been far below normal consumption requirements.

The rise in production per family over recent decades is a measure of advancing living standards in America, because the extent to which steel is used reflects the spread of modern comforts and conveniences.

Included in the steel and iron used directly by families are the steel in automobiles, mechanical refrigerators, the steel springs in beds, davenport chairs, kitchen ranges, containers, steel card tables, fly screens, steel and iron heating and plumbing equipment and a long list of other household and personal belongings made entirely or partly of products of the iron and steel industry.

The iron and steel which families buy directly include the machinery and equipment used in the manu-

facture and distribution of such goods as textiles, glassware, foods and gasoline. Some portion of the retail price of every one of these, usually an almost infinitesimal amount, represents the cost of the steel in the machines which wove the cloth, molded the glass and the equipment which preserved the food and refined the gasoline.

Among the numerous other indirect steel purchases by families are the steel rails and rolling stock of street car lines and railroads, which are paid for by the fares and freight revenues received. Furthermore, some part of every nickel paid for a telephone call pays for the steel in the equipment generating the current used, the steel used in the 'phone itself and in the machinery which made it.

Even a part of the money which members of a family pay out in local, State and Federal taxes goes to buy the steel used in bridges, dams, Government buildings, equipment, etc.

Foundry Equipment Makers Hold Meeting

WITH an attendance of 60 members the Foundry Equipment Manufacturers Association held its annual meeting at the Hotel Cleveland, Cleveland, Feb. 8. Following a luncheon a business session was held which was devoted largely to discussions of organization matters. The association plans some broadening of its activities, which will include the development of a closer under-

standing with users of foundry equipment regarding the equipment best suited to meet their needs.

The making of exhibits at the foundry show to be held in Detroit in connection with the annual meeting of the American Foundrymen's Association in May was discussed and in view of the improvement in the demand for foundry equipment and the better outlook in the industry expressions by members indicate that the industry will be well represented at the Detroit show.

In the election of officers Robert S. Hammond, vice-president Whiting Corp'n., Harvey, Ill., was named as president and B. C. Trueblood, treasurer Arcade Mfg. Co., Freeport, Ill., was elected vice-president. Arthur J. Tuscany, Cleveland, was reelected secretary-treasurer. Three new directors were elected: E. O. Beardsley, Beardsley-Piper Co., Chicago; R. W. Hisey, Osborn Mfg. Co., Cleveland, and Thomas Kaveney, Jr., Herman Pneumatic Machine Co., Pittsburgh.

Steel Founders' Group Holds Election

AT a recent meeting of the Steel Founders' Society of America, Col. Merrill G. Baker was reappointed executive vice-president and R. L. Collier secretary-treasurer. An election was held at which the following were elected to the board of directors for the coming year:

Lee C. Wilson, Reading Steel Casting Division, Reading, Pratt & Cady Co., Reading, Pa.; George H. Chisholm, Atlas Steel Casting Company, Buffalo; Frank M. Robbins, Ross-Meehan Foundries, Chattanooga, Tenn.; D. C. Bakewell, Duquesne Steel Foundry Division, Continental Roll & Steel Foundry

Greater Accuracy-Safety-Speed

in NEW AXIAL PASS ALIGNMENT CLAMPS*

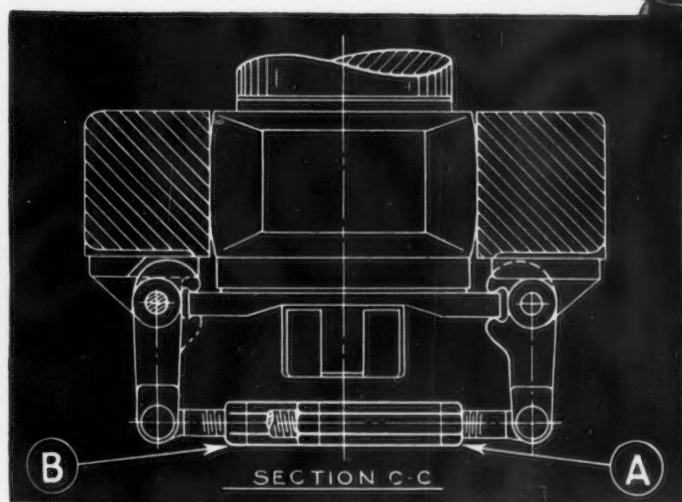
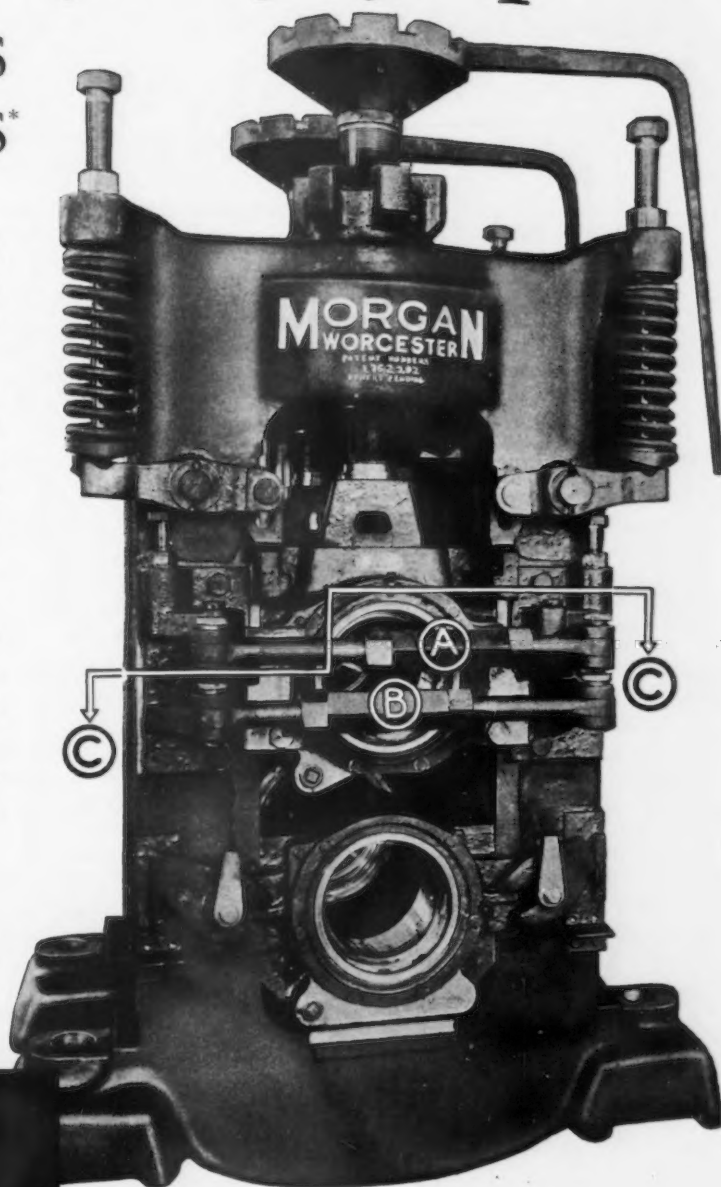
This newest Morgan development in combination with Morgoil bearings, makes precision axial pass alignment a simple matter. This adjusting mechanism is usually applied on the working side only to one of the rolls as illustrated.

The clamps operate on the parallelogram principle with jaws joined by two heavy turnbuckles across the end of the bearing. For adjustment one turnbuckle is slacked and corresponding amount taken up on the other. Parallelogram design removes all danger of cramping the bearing in the housing window.

Opposing tension and compression of the two turnbuckles completely eliminates play and backlash. For changing rolls the entire unit is easily swung free of the housing window. Accessible—accurate—positive—efficient—Morgoil Bearing Alignment Clamps are a new contribution to mill efficiency. Write for further details.

*Patents applied for.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS, U. S. A.



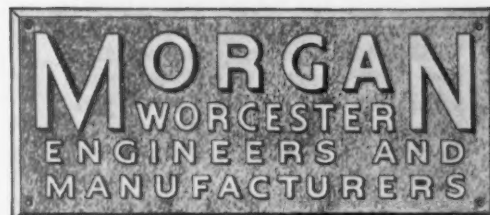
The Stand, without rolls, showing Alignment Clamps in operating position with Morgoil bearings.

A. When turnbuckle **A** is taken up, decreasing length of clamp, two dogs push the bearing inward.

B. When turnbuckle **B** is turned, increasing length of clamp, two dogs push the bearing outward. Lock nuts protect the completed adjustment.

R3

New PRECISION AXIAL PASS ALIGNMENT CLAMPS



THE IRON AGE, February 20, 1936—67

Co., Pittsburgh; A. H. Anthony, Massillon Steel Casting Company, Massillon, Ohio; F. A. Lorenz, Jr., American Steel Foundries, Chicago; Paul H. Leussler, Omaha Steel Works, Omaha, Neb.; and J. P. Arnoldy, Warman Steel Casting Company, Huntington Park, Cal.

St. Louis Firm Moves to Detroit

THE General Fire Truck Corp'n. has moved its entire manufacturing facilities from St. Louis to Detroit. It has taken over a former warehouse at 2200 East Jefferson Avenue, and will occupy about 35,000 sq. ft. of floor space at this address.

Like other firms in its line, the company manufactures its fire truck largely from assembled units, such as engines, transmissions and rear axles, but carries on fabrication of the frames and the manufacture of auxiliary equipment. Beside the fire truck line, the company also makes fire extinguishers of both the soda and carbon tetrachloride type, as well as hose couplings.

The firm, which has been located in St. Louis for over 30 years, has made this move so as to be closer to its Eastern market and to automotive parts manufacturers. A sales and service office will be continued in St. Louis.

Present officers of the company are Charles K. Huthsing, president, H. B. Huthsing, vice-president, and R. L. Braden, secretary.

USL Arc Welders Now Made at Syracuse

ARC welding equipment and accessories manufactured by the USL Battery Corp'n., Niagara Falls, N. Y., are now being made and sold by the Owen-Dyneto Corp'n., Syracuse, N. Y. Both companies are subsidiaries of Electric Auto-Lite, the Owen-Dyneto organization being engaged in the manufacture of motors, generators, battery charge regulators and other electrical equipment. The entire engineering staff, machinery and other equipment of the USL Niagara Falls plant have been transferred to the Syracuse works, and J. L. Fosnight continues as sales manager of the electric arc welding division. In addition to the present USL line, arc welders incorporating new features that make for more stable arc, greater welding speed, wider range, and more efficient performance are said to be in process of design.

Industrial Bankruptcies Declining in Germany — Poland Begins Barter Trade

HAMBURG, Feb. 1. (*By Special Correspondence.*) — In 1931, bankruptcies in Germany reached the highest figure ever recorded for one year. The total figure was 28,000 companies involving losses of 1,400,000,000 M. In 1934, the figure fell to 6600 companies with 400,000,000 M. and last year to 4700 companies with 280,000,000 M. This was the lowest normal post-war figure. In 1913, 12,100 companies failed with 780,000,000 M. capital or losses.

Since the holidays and the first half of January the iron and steel export market has shown a satisfactory revival. This concerns particularly the demand for sheets, girders, channels, joists and hoops, whereas bars and rods are neglected. Business from Latin America has been particularly satisfactory. It is interesting that Poland is following the footsteps of Germany and is organizing barter business with Latin America. Among recent orders is one for 4000 tons of structural steel, hoops and plates from Brazil in exchange for tea, coffee and citrus fruits.

German works will construct motor car assembly plants abroad. The Mercedes Benz Co. which recently opened works at Copenhagen (where the Ford works due to inability to obtain foreign exchange were closed down) is now located at Buenos Aires also and another works will be built in Bombay, India. German motor car production which is usually declining in winter was, on the contrary, showing upward figures this year, the November output having 17 per cent better than October's, and December's 4 per cent better than November's. This is partially due to the fact that winter prices were introduced which gave special rebates to cars registered before January 14 (up to 8 per cent). The total German production of all motor vehicles combined was 168,000 in 1933, 267,000 in 1934 and 374,000 in 1935, and it is scheduled to mount to 425,000 in 1936. Exports amounted to 3.8 per cent of total production in 1933, 4.7 per cent in 1934 and 5.4 per cent in 1935, so that the absolute figures show a remarkable gain.

Russian orders for machinery and steel in Germany show a sharp rise. It will be remembered that besides passing monthly orders for 5,000,000 to 8,000,000 M. to the Ger-

man industry, Russia has placed a large contract on a compensation basis in June, 1935. This contract was to be specified before May 31, 1936. The orders are accumulating, however, to such an extent that the order will be specified before March 15, and another 80,000,000-M. contract is to follow. Among recent orders those of 1300 tons of alloy steels and 12,000 tons of special steel, 170 Diesel engines and more than 450 machine tools are particularly noteworthy. The whole order is paid for by direct shipment of oil, hides, ores, furs, oil cakes and metals.

Freight rates for export of iron and steel in Germany via Danube ports have been further reduced. Prices for most iron and steel wire products have been reduced 5 to 7½ per cent.

Much High Tensile Steel in B. & L. E. Cars

THE recent award of 1000 90-ton and 1000 70-ton hopper cars for the Bessemer & Lake Erie, and 1000 70-ton mill type gondolas for the Union Railroad, will mean the use of approximately 40,000 tons of steel, together with 24,000 wheels (8740) tons, and 12,000 axles (5932 tons). Included in the 40,000 tons will be approximately 20,000 tons of Cor-Ten (high-tensile steel) shapes, plates, bars, strip and sheets. Of this total, the Pittsburgh district will furnish approximately 13,300 tons of Cor-Ten steel, 20,000 tons of copper bearing steel, 22,000 wheels (8130 tons), 11,000 axles (5424 tons), or a total of 46,854 tons. The Chicago district will produce 6700 tons of Cor-Ten steel, 2000 wheels (610 tons), 1000 axles (508 tons) or a total of 7818 tons.

Of particular interest in connection with this award is the fact that approximately 20,000 tons of Cor-Ten steel, which has been developed by the corporation, will be utilized in the construction of the 2000 hopper cars for the Bessemer & Lake Erie Railroad. This represents the largest order as yet placed for high tensile steels, being a splendid tribute to this material in the construction of railroad cars.

Pacific Coast Steel Fabricators to Protest

THE Pacific Coast Fabricators, at their annual meeting at Del Monte, Cal., voted to file a formal complaint with the Federal Trade Commission attacking the allegedly artificially high mill base prices of such bars, shapes and sheets as are produced in Pacific Coast rolling mills. The association reiterated its position as opposed to the alleged unreasonably high differential between eastern and Pacific Coast mill prices, the granting by the mills of excess "equalizing" allowances to eastern fabricators doing business in this territory and further went on record as favoring a \$4 per ton price differential to recognized fabricators on the West Coast.

Officers elected for 1936 are as follows: President, Reese H. Taylor; Consolidated Steel Corp., Los Angeles; vice-president: Paul Pigott, Pacific Car & Foundry Co., Seattle; George Raitt, Steel Tank & Pipe Co., Berkeley; Charles McGonigle, Poole & McGonigle, Portland; secretary-treasurer, P. F. Gillespie, Judson-Pacific Co., San Francisco. T. A. L. Loretz will continue as assistant secretary and manager.

Job Cost Is High In Steel Industry

APPROXIMATELY \$11,500 is required to finance and maintain the average job for an employee of the steel industry, according to the American Iron and Steel Institute. This amount represents the average cost of providing an employee with a place to work, tools to work with and materials to work on.

The manufacture of iron and steel products requires such a concentration of heavy, complicated machinery and such a large investment in raw material properties and equipment and in manufacturing lands, buildings and machinery that for each employee of the industry an average of \$8,990 is required for the necessary real estate, buildings, machinery and other equipment.

An ample supply of raw, semi-finished and finished iron and steel products must be constantly maintained which requires a further huge investment amounting to \$1,580 per employee.

The average job also requires that a large amount of ready cash

KEEP YOUR CONVEYING COSTS DOWN! USE LINK-BELT ANTI-FRICTION IDLERS

● Free-turning, accurately made idlers assure the belt conveyor a good roadbed for economical operation... minimum friction loads... long belt life... and the lowest maintenance cost. Link-Belt makes a full line of anti-friction pressure-lubricated idlers, as well as all necessary machinery and driving parts for the complete conveyor.

Submit your conveyor and power transmission problems to Link-Belt. Send today for Catalog. Address nearest office.

LINK-BELT PRODUCTS INCLUDE: Elevators and Conveyors of all types... Feeders... Vibrating Screens... Skip Hoists... Bucket Carriers... Portable Loaders... Speed Reducers... Variable Speed Transmissions... Silverlink Roller Chain Drives... Silverlink Roller Chain Drives... Chain Drives of all types—Malleable Iron, Promal or Steel... Elevator Buckets... Bearings... Take-ups... Gears... Sprockets... Pulleys... Couplings... etc. Send for Catalog.



LINK-BELT COMPANY

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power
CHICAGO INDIANAPOLIS PHILADELPHIA
ATLANTA SAN FRANCISCO TORONTO
Offices in Principal Cities

5552-B

be available in order that a steady flow of raw and other purchased materials may be maintained; that operations may continue between the time finished products are shipped to customers and the time payments are received; that payrolls, taxes, freight and interest charges, operating expenses, etc., may be made promptly and that repairs and replacements of ma-

chinery and equipment may be made when required.

All of these items represent a total investment in the steel industry of over \$4,700,000,000 or an average of approximately \$11,500 per employee. Net return on this huge investment, after meeting all expenses, over the past ten years has amounted to only about 2.5 per cent.

Finished Steel Production Rose at Year-End

PRODUCTION of finished steel products for sale during 1935 by former members of the steel code amounted to 22,109,855 gross tons, according to the American Iron and Steel Institute. This compares with 17,423,843 tons in the preceding year and with 15,330,984 tons in 1933, the first year the compilation was made.

Export shipments last year were 895,148 tons, while shipments to non-integrated companies for fur-

ther conversion were 5,269,900 tons. In 1934, the corresponding figures were 900,354 tons and 3,750,785 tons respectively, compared with 572,939 tons and 3,912,807 tons respectively in 1933.

However, only 197 companies reported their 1935 tonnage, against 217 companies in 1934 and 213 in 1933.

Fourth-quarter production of steel products for sale by former

code members totaled 6,283,104 gross tons, while shipments to members of the industry for further conversion were 1,580,236 tons and exports amounted to 253,125 tons. In the fourth quarter last year only 3,445,200 tons was produced for sale, export shipments were 227,547 tons and movement for further conversion was 744,845 tons.

Detailed figures are shown in the accompanying table.

Production of Steel Products for Sale in Fourth Quarter and Full Year 1935

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

STEEL PRODUCTS:		Number of Companies	Items	Annual Capacity Gross Tons	Production for Sale—Gross Tons						Year—Shipments			
					Fourth Quarter			Shipments			Shipments			To Members of the Industry for Conversion into Further Finished Products
					Total	Per Cent of Capacity	Export	Total	Per Cent of Capacity	Export	Total	Per Cent of Capacity	Export	
Ingot, blooms, billets, slabs, sheet bars, etc.	43	1	.....	1,340,880	.....	.....	4,891	1,151,435	4,410,447	.....	43,643	3,876,843	.....	.....
Heavy structural shapes.....	14	2	5,440,820	385,622	28.4	10,202	.....	1,329,959	24.4	37,919	.....	.....	.....	.....
Steel piling.....	6	3	270,000	27,265	40.4	657	.....	121,770	45.1	5,186	.....	.....	.....	.....
Plates—Sheared and Universal.....	27	4	6,393,635	416,891	26.1	15,495	4,252	1,421,797	22.2	44,498	14,144	.....	.....	.....
Skelp.....	11	5	.....	151,224	.....	30,940	84,982	437,621	.....	61,347	268,407	.....	.....	.....
Rails—Standard (over 60 lbs.).....	8	6	4,170,000	153,783	14.8	1,657	.....	621,245	14.9	19,577	.....	.....	.....	.....
Light (60 lbs. and under).....	8	7	775,820	14,670	7.6	531	.....	51,412	6.6	8,238	.....	.....	.....	.....
All other (Incl. girder, guard, etc.).....	3	8	140,000	4,589	13.1	396	.....	29,663	21.2	3,296	.....	.....	.....	.....
Splice bar and tie plates.....	19	9	1,622,393	41,291	10.2	1,077	.....	235,373	14.5	3,686	.....	.....	.....	.....
Bars—Merchant.....	46	10	.....	741,332	.....	12,201	78,316	2,650,574	.....	42,989	267,602	.....	.....	.....
Concrete reinforcing.....	33	11	.....	139,355	.....	2,425	.....	500,767	.....	8,412	.....	.....	.....	.....
Cold finished—Carbon.....	18	12	.....	154,468	.....	869	.....	504,143	.....	4,564	.....	.....	.....	.....
Alloy—Hot rolled.....	18	13	.....	153,379	.....	1,210	8,148	535,253	.....	3,083	35,711	.....	.....	.....
Cold finished.....	12	14	.....	14,145	.....	71	.....	50,657	.....	204	.....	.....	.....	.....
Hoops and baling bands.....	8	15	.....	11,387	.....	175	.....	48,169	.....	1,378	.....	.....	.....	.....
Total bars.....	68	16	13,114,245	1,214,066	37.0	16,951	86,464	4,289,563	32.7	60,630	303,313	.....	.....	.....
Tube rounds.....	8	17	.....	16,794	.....	.....	16,243	63,224	.....	.....	57,825	.....	.....	.....
Tool steel bars (rolled and forged).....	18	18	110,320	8,764	31.8	21	.....	31,302	28.4	104	.....	.....	.....	.....
Pipe and tube—B. W.....	16	19	1,829,928	155,696	34.0	5,008	.....	522,834	28.6	24,694	.....	.....	.....	.....
L. W.....	11	20	1,804,534	92,232	20.4	3,189	.....	334,417	18.5	12,043	.....	.....	.....	.....
Electric weld.....	3	21	813,571	22,701	11.2	109	.....	75,984	9.3	341	.....	.....	.....	.....
Seamless.....	15	22	2,519,978	185,908	29.5	4,685	.....	770,584	30.6	24,694	.....	.....	.....	.....
Conduit.....	6	23	142,350	11,038	31.0	.....	.....	39,077	27.5	.....	.....	.....	.....	.....
Mechanical tubing.....	5	24	212,050	21,689	40.9	937	.....	74,775	35.3	5,175	.....	.....	.....	.....
Wire rods.....	20	25	.....	179,532	.....	7,553	74,744	555,451	.....	24,354	268,092	.....	.....	.....
Wire—Drawn.....	40	26	1,732,532	260,134	60.1	14,806	5,004	931,334	53.8	43,891	17,556	.....	.....	.....
Nails and staples.....	22	27	1,156,642	123,849	42.8	4,066	.....	427,087	36.9	14,507	.....	.....	.....	.....
Barb, fence, bale ties, fence posts, etc.....	26	28	1,588,364	99,241	25.0	10,081	.....	457,402	28.8	34,662	.....	.....	.....	.....
Black plate.....	15	29	428,879	94,541	88.2	2,777	31,736	312,601	72.9	8,876	106,496	.....	.....	.....
Tin plate.....	16	30	2,526,256	379,643	60.1	53,397	.....	1,657,954	65.6	169,203	.....	.....	.....	.....
Sheets—Hot rolled.....	25	31	.....	354,765	.....	3,050	39,460	1,162,287	.....	18,121	118,355	.....	.....	.....
Hot rolled annealed.....	26	32	.....	427,169	.....	9,454	247	1,458,306	.....	40,287	1,703	.....	.....	.....
Galvanized.....	19	33	.....	274,130	.....	22,352	.....	902,073	.....	79,552	.....	.....	.....	.....
Cold rolled.....	23	34	.....	499,609	.....	10,920	.....	1,601,501	.....	38,760	.....	.....	.....	.....
All other.....	16	35	.....	134,694	.....	1,963	.....	413,700	.....	7,048	.....	.....	.....	.....
Total sheets.....	37	36	7,871,255	1,690,367	85.9	47,739	39,707	5,537,867	70.4	183,768	120,058	.....	.....	.....
Strip—Hot rolled.....	35	37	3,476,456	545,214	62.7	7,508	85,669	1,904,835	54.8	31,507	242,166	.....	.....	.....
Cold rolled.....	39	38	1,101,592	162,026	58.8	2,904	.....	536,353	48.7	10,484	.....	.....	.....	.....
Wheels (car, rolled steel).....	6	39	398,284	21,891	22.0	116	.....	83,039	20.8	8,310	.....	.....	.....	.....
Axles.....	9	40	429,900	12,198	11.3	3,724	.....	25,969	6.0	5,600	.....	.....	.....	.....
Track spikes.....	12	41	345,760	25,352	29.3	221	.....	76,758	22.2	981	.....	.....	.....	.....
All other.....	7	42	21,207	4,249	80.1	1,487	.....	12,058	56.9	3,934	.....	.....	.....	.....
Total steel products.....	168	43	.....	7,863,340	.....	253,125	1,580,236	27,379,755	.....	895,148	5,269,900	.....	.....	.....
Estimated total steel finishing capacity based on a yield from ingots of 67.3 per cent.....	44	45,617,500	.....	55.1	.....	.....	.....	.....	48.5	.....	.....	.....	.....	.....
IRON PRODUCTS:														
Pig iron, ferro manganese and spiegel.....	35	45	.....	1,320,683	.....	3,310	431,266	3,775,898	.....	6,040	1,169,230	.....	.....	.....
Ingot moulds.....	6	46	.....	91,039	.....	1,209	.....	276,185	.....	5,566	.....	.....	.....	.....
*Plates.....	47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*Skelp.....	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bars.....	14	49	249,019	12,408	19.9	1	255	44,344	17.8	26	1,256	.....	.....	.....
*Splice bars and tie plates.....	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pipe and tubes.....	4	51	213,153	8,379	15.7	81	.....	34,885	16.4	342	.....	.....	.....	.....
*Sheets.....	52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other.....	7	53	153,460	6,509	17.0	259	379	27,550	18.0	1,141	2,134	.....	.....	.....
Total iron products (items 47 to 53).....	19	54	557,672	27,296	19.6	341	634	106,779	19.1	1,509	3,390	.....	.....	.....

*Included in "All other."

Total companies included—197.

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Fourth quarter, 6,283,104 gross tons; 55.1 per cent of finishing capacity. Year 22,109,855 gross tons; 48.5 per cent of finishing capacity. The above tonnages represent 67.3 per cent of the ingots produced by companies whose products are included above.

World Ship Launchings 35 Per Cent Greater

THE total tonnage of merchant vessels launched throughout the world in 1935, according to Lloyds Register of Shipping, was 1,302,080 gross tons, or 335,000 tons more than in 1934. The report covers all vessels of 100 gross tons and upwards for all countries except Russia, for which returns are not available.

With only two of the 10 leading maritime countries of the world failing to show an increase, the 1935 tonnage was approximately 35 per cent greater than total launchings in 1934. Japan and Italy registered declines, but Germany's tonnage was three times as much as in 1934. France's was two and a half times greater, Sweden's and Denmark's two times greater, while for the United States the tonnage launched was a third greater. Though Great Britain and Ireland continue to lead the world in shipbuilding, their combined launchings in 1935 indicated a gain of but slightly more than 10 per cent, as compared with 1934.

Great Britain and Ireland, Germany, Denmark and Sweden were the only nations to launch over 100,000 gross tons in 1935.

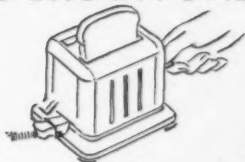
For several years past Great Britain and Ireland have gradually increased their lead over the United States. Last year they launched 467,000 tons more than this country. But in 1919, American shipyards launched 2,455,000 tons more than Great Britain and Ireland. The 1935 comparisons reveal a proportion of approximately one ton launched in this country to 15 tons launched by Great Britain and Ireland.

Total tanker construction in 1935 was 338,021 gross tons, of which motor vessels constituted 280,743 tons. Germany led in tanker construction. Motorship launchings in 1935 were 325,000 gross tons more than the combined tonnage of all other types of vessels.

The largest vessels launched in the world during 1935 were built in Great Britain and Ireland. These were the Athlone Castle and the Stirling Castle, each with a gross tonnage of 25,500.

In the ranking of the various ship-constructing countries last year, Germany took second place from Japan, which moved into third place, occupied by Germany in 1934. France advanced from tenth to seventh place, exchanging positions with Italy. As usual, Great Britain and Ireland occupied the lead. The United States maintained its status as eighth in line.

NOT ENOUGH JUICE TO BROWN ONE SLICE



... but

enough to hold 200 lbs. of steel to a square inch!

That last slice of toast you had this morning took far more current than it takes to hold a tenth of a ton of steel to one square inch of the faceplate of a Superpower Magnetic Chuck!

Yet even with such low current consumption, Superpower has a heavier pull than others. Surplus flux above the faceplate makes possible a greater versatility of set-up with only steel parallels and angles. Also, there is more actual working surface, allowing wider range of work, stepping up machine production. Smaller work-units are

held more securely because of the finer mesh of the face.

For twenty years Taft-Peirce has steadily improved the design and efficiency of Superpower Magnetic Chucks, until now you can choose from a complete line of rectangular and rotary models, each one compact, of minimum height, waterproof under wet grinding—and tested to the same standards as heavy duty outdoor electrical equipment. Investigate the economies that Superpower Chucking can bring to your own operations—write for bulletin today.



THE TAFT-PEIRCE MFG. CO.

WOONSOCKET, RHODE ISLAND

2240

The following table, included in Lloyds report, gives the rankings of the various countries in 1935. Figures are in gross tons:

Great Britain and Ireland	499,011
Germany	226,343
Japan	145,914
Denmark	122,095
Sweden	105,538
Holland	57,133
France	42,783
United States	32,607
Norway	25,716
Italy	22,667

Sundstrand to Buy American Broach

THE Sundstrand Machine Tool Co., Rockford, Ill., is to acquire the entire capital stock of the American Broach & Machine Co., Ann Arbor, Mich. Application has been made for the listing of 29,145 shares of no par value common stock of the Sundstrand company on the Chicago Curb Exchange for the purpose of this acquisition.

PERSONALS

EDWIN T. WARREN has been appointed superintendent of blast furnaces for Edgar Thomson steel works, Carnegie - Illinois Steel Corp., succeeding F. H. N. GERWIG, who is on leave of absence. Mr. Warren began his business career with the Baltimore warehouse of the Carnegie Steel Co. in July, 1915. In September of that year he was transferred to Homestead steel works engineering department, where he remained until February, 1918, when he enlisted in the United States Army and served one year overseas in the engineering corps. Upon his discharge from the army he returned to the metallurgical department at Homestead in June, 1919. He was made assistant superintendent of open hearth No. 3 in February, 1925, and was advanced to assistant superintendent of Carrie furnaces in May, 1928. He was graduated from Wooster Polytechnic Institute in 1915, and is a member of the Eastern States Blast Furnace and Coke Oven Association.

♦ ♦ ♦

RAYMOND K. BOWDEN, heretofore assistant to the general superintendent and in charge of product control of the Illinois Steel Co., has been made manager of the metallurgical department, Chicago district, for the Carnegie-Illinois Steel Corp. Mr. Bowden was graduated from Ohio State University in 1920 and, after serving as instructor of metallurgy at Carnegie Institute of Technology, joined the metallurgical department of the Central Steel Co. and

its successors, the Central Alloy Steel Co. and Republic Steel Corp. He joined the Illinois Steel Co. in 1930 at the South Works as superintendent of alloy production and later was placed in charge of the general production department.

♦ ♦ ♦

KENNETH S. VALENTINE has been appointed district manager for New York of the Patterson Foundry & Machine Co. He will have charge of sales in metropolitan New York and New England. Mr. Valentine was sales manager of the Turbo Mixer Corp., New York, for eight years, until resigning to become connected with the Patterson company. Previously he was chemical engineer for the Heller & Merz Co., now Calco Chemical Corp. of Newark, N. J., and works manager of the Southern Dyestuffs Co., now the Monsanto Chemical Co. of Nitro, W. Va. He is well known in the chemical and process industries and is co-author of the section, "Mixing of Material," in the "Chemical Engineering Handbook," and also author of various books and articles on mechanical problems of the process industries. He was graduated from Columbia University in 1916 and is a member of the American Institute of Chemical Engineers.

♦ ♦ ♦

LOUIS J. DESPAROIS has been named district sales manager of the newly opened St. Louis office of Pickands Mather & Co. His headquarters are at 1255 Telephone Building. Mr. Desparois has been

with Pickands Mather since Jan. 1. Previously he had been two years with Hickman Williams & Co., eight years with the St. Louis Coke & Gas Co. and 12 years with American Radiator Co.

♦ ♦ ♦

LLOYD JONES has retired as vice-president of Continental Roll & Steel Foundry Co. While illness has forced him to forsake an active part in the company, he will be connected in a consulting engineering capacity. He served formerly with United Engineering & Foundry Co., and recently had been identified with E. W. Bliss Co. at Salem, Ohio.

♦ ♦ ♦

A. H. FROST, chief automotive engineer of the White Star Division, Socony-Vacuum Oil Co., spoke before the Detroit chapter of the American Society of Tool Engineers on Feb. 13 on "Modern Automotive Lubrication and Maintenance." Mr. Frost's talk covered some of the results of recent developments in lubrication and maintenance of modern bearings and fits as affecting design. He was followed by C. D. FREEBURN, industrial lubrication engineer of the same company, who discussed industrial coolants, cutting compounds and oils.

♦ ♦ ♦

A. H. ZASTROW has been appointed traffic manager of the A. O. Smith Corp., Milwaukee, to fill the vacancy caused by the death on Feb. 7 of George B. Hetherington. Mr. Zastrow was connected with the company several years ago, but more recently was identified with the Western Weighing and Inspection Bureau in Milwau-



E. T. WARREN



R. K. BOWDEN



K. S. VALENTINE



L. J. DESPAROIS

kee. Earlier experience was gained with the Milwaukee Road.

♦ ♦ ♦

G. R. SHARPLEY, prominent British industrialist, has been spending some time in Milwaukee visiting executives of the Bucyrus-Erie Co., South Milwaukee. He is managing director of Ruston & Jornsby, Ltd., Lincoln, England, and a director of Ruston-Bucyrus, Ltd., British affiliate of the South Milwaukee industry, and a number of other manufacturers of heavy machinery.

♦ ♦ ♦

M. A. CARPENTER has been appointed sales manager for the Falk Corp., Milwaukee, succeeding L. A. GRAHAM, who has resigned. Mr. Carpenter has been with the Falk Corp. for 12 years, first in the capacity of advertising manager and later as sales promotion manager.

♦ ♦ ♦

JOSEPH G. SCHAEFER has been appointed manager of the Ambridge, Pa., and Chicago plants of the Wyckoff Drawn Steel Co. He succeeds John M. Adams, whose death was announced recently in THE IRON AGE, as manager of the Ambridge plant. He served formerly as superintendent of the Chicago works, where he was employed after its purchase from the Fitzsimmons Iron & Steel Co.

♦ ♦ ♦

C. L. HUFF, heretofore sales manager in charge of western sales for Bliss & Laughlin, Inc., Harvey, Ill., has been elected vice-president in charge of general sales. He has been identified with the steel industry since 1907, when he was employed in the department of metallurgy and inspection of the Illinois Steel Co. After war service with the Navy as inspector of tests, he became assistant purchasing agent for the Steel & Tube Co. of America. He became affiliated with the sales department of the Bliss & Laughlin Co. in 1923 and five years later was advanced to Chicago district manager of sales. The following year he was advanced to the position he held at the time of his present promotion.

GEORGE A. SPAULDING, sales manager in charge of eastern sales, has been elected vice-president in charge of the eastern mill located at Buffalo, and eastern activities. Prior to his affiliation with the Bliss & Laughlin Co., he was identified with the Moline Plow Co. as purchasing agent and the Tri-City Malleable Iron Co. as sales manager. He joined the sales department of the Bliss company as a salesman in charge of the



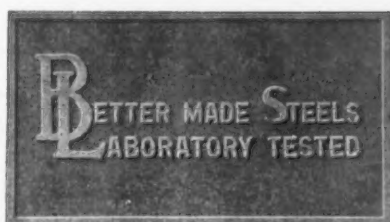
SPECIAL SECTIONS

The first part of your forming and machining work is already done for you, when you employ B & L Special Sections in your fabricating operations.

They come pre-formed to the shape of your product, ready for "slicing off" and finishing—the short cut to economy in making duplicate machine parts.

These cold drawn sections are made to order in B & L mills, where the most modern equipment and facilities permit high accuracy in production at a cost that will show a real saving in your own plant.

If you have a problem that suggests the use of B & L Special Sections, let us demonstrate their practical application to your product.



COLD DRAWN BARS AND SHAFTING • ULTRA-CUT STEEL • ALLOY STEELS

BLISS & LAUGHLIN, INC.

HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

Iowa-Nebraska territory and was transferred to the Cleveland office in 1929 as district manager of sales. He was promoted and sent to the eastern mill at Buffalo in 1933.

♦ ♦ ♦

CLARENCE W. HOWAT has resigned as first vice-president of the Pittsburgh Steel Foundry Corp., Glassport, Pa. He became affiliated with this company in an executive sales capacity in 1923, and in 1925 became first vice-president. He has been identified with the steel cast-

ings industry for about 25 years, serving in both production and sales capacity.

♦ ♦ ♦

S. H. SCHACHTEL, who since December, 1934, has been district manager of the David J. Joseph Co., dealer in scrap iron and steel, Youngstown, has been made vice-president of Philip W. Frieder Co., Cleveland. Mr. Schachtel had been associated with the Joseph company since 1917, having been engaged previously in the engineering field.

Coordinated Design and Operation Feature New Rolling Mill

(CONCLUDED FROM PAGE 45)

is made in the design to install an edger just ahead of this stand at a future date if desired.

On leaving the 2-high roughing stands the elongated slab moves on to a 4-high 21-in. and 45-in. x 43-in. roughing stand, which is a duplicate of the stands in the finishing train. This stand is preceded by an edger of the same kind as the first edger and which has 1000-lb. water jets for scale removal.

The cooling table is equipped with a specially designed motor-operated rocking device and its speed is adjustable to suit the delivery speed of material from the roughing train and the entering speed desired for the finishing scale breaker. Provision has been made in designing the foundations of this table to enable the new air-blast type of cooling recently perfected by the United Engineering & Foundry Co. for the Ford mill to be installed at a later date.

The finishing scale breaker is a 2-high 28-in. x 43-in. stand driven by a 500 hp., 250-750 r.p.m. motor, and is designed to operate at speeds ranging from 103 to 310 ft. per min.. Immediately following the scale breaker is a flying crop shear of the double-crank type perfected by the United organization. This unit will cut material to $\frac{7}{8}$ -in. thick by 37 in. wide, the knife having essentially the same action as in a gate shear.

In the finishing train are six stands of 4-high 21-in. and 45-in. x 43-in. mills designed and built by United. Housings are of cast-steel construction and all spindles are of the universal type for quiet and efficient operation.

All back-up and work roll necks on the finishing train as well as in the 4-high roughing stand, are equipped with Timken tapered roller bearings. The back-up roll neck bearings are two-row assemblies 21-in. x 38-in. x 19 $\frac{1}{2}$ -in. and the bearing cones have a tapered bore. The work roll bearings are four row units 13 $\frac{1}{2}$ -in. x 18-in. x 10-in. These roll neck bearings were designed to give a 15,000-hour life when operating under a separating force of 2,250,000 lb. at 2000 ft. per min.

Ground cup spacers for the two-row back-up roll neck bearings and cup and cone spacers for the work roll bearings are provided by the factory to give these mill bearings the proper set up. The assembly

is locked in place on the roll necks by means of standard nuts on a threaded outer ring clamping a split inner ring. The inner filler ring is shrunk in place on the roll neck. The chock design provides a lip which fits close to the inner face of the bearing cone and as a result the bearing and chock may be removed as a sealed assembly. A special inner closure guards against the entrance of mill scale, grit, or water. This consists of a dual type rawhide seal with the inner lip pointing toward the bearing to retain lubricant, and the outer lip reversed to prevent the entrance of water or scale. In addition to this seal a piston ring is fitted loosely into a groove in the inner filler ring, remaining stationary with regard to the outer closure retaining ring, which is bolted in place, thus providing what amounts to an extra labyrinth to protect the bearing against scale or water.

The fixed chocks in all stands in the McDonald mill are provided with a new and unique method of clamping. Filler plates and adjusting wedges have been eliminated. In place of the customary clamp plate bolted in position, the fixed chocks in this new mill are held in place by latches, which are part of the chock. In the new design the keeper plate is inside the housing and is pressed and keyed on a shaft which extends through the chock, a hand-lever being attached to the outer end, as will be seen from the diagram and photograph. Two of these latches are used on each fixed chock, all types of bearing mountings being so adapted in this mill.

Extensive use has been made of Selsyn control devices for indicating roll and side guard settings. Twenty-eight units are installed in connection with the screw-downs on the 4-high stands of the finishing train and the 4-high roughing stand, both sides of the stands being so equipped. Twelve transmitters and receivers aid the operators in setting side guards. Three units are used for indicating mill roll openings in connection with the three 2-high roughing stands, and two sets of Selsyn transmitters and receivers are installed in connection with the slab reducer. These electrical aids make it possible for one man to set the rolls, guides, or guards quickly, easily, and accurately. Indicators are mounted on the mill housings and

adjustments made by push-button control.

As material leaves the last stand of the finishing train it goes through a drum-type flying shear. This may be set in increments of $\frac{1}{8}$ in. to cut sheets from 10 ft. to 30 ft. in length or to end crop strip.

Strip or sheets passing the flying shear advance over a runout table capable of handling material at 2300 ft. per min., the table rollers being individually motor-driven. All rollers are mounted on anti-friction bearings, Timken Bearings being used on the motor side, as is the case throughout the mill.

As the McDonald mill is designed to produce the heaviest coil per unit width as yet attempted, particular care was exercised in designing the coilers. These are unusually heavy for their width to assure rigidity, and the coiler rollers are hardened and ground. Each coiler is equipped with a pneumatic ram to push the coils off the reel on to a transfer carriage, which in turn deposits them on the coil conveyor, a separate carriage being provided for each machine.

All conveying and coil transferring equipment is specially designed with the idea of avoiding coil marking, turned edges, etc. Such details as size and spacing of rolls in roller sections of the conveyor system, special side guards, etc., have been watched closely. The pallet conveyor may be operated at a constant speed or its rate of travel regulated from a pulpit in the finishing department so as to gain the maximum cooling of coils on the conveyor without slowing down the coilers.

A gravity type conveyor with closely spaced rollers runs across the end of the finishing department. From this the coils are fed to storage conveyors leading to three finishing units.

Special provision has been made throughout the entire mill for natural lighting as well as artificial illumination, for good light is one of the features necessary for the production of high quality strip and sheet. In the finishing departments overhead steam unit heaters have been installed so that comfortable working conditions can be easily maintained even in the coldest weather. Adequate ventilation is likewise provided, making the whole mill one of the most comfortable and pleasant plants yet erected.

All main motors and switch boards are grouped in a special air-conditioned motor room, all d.c. equipment being Westinghouse.

Capital Goods Industries More Active

HEAVERY industrial operations, as measured by THE IRON AGE weekly capital goods activity index, are up 1.8 points to 73.9 per cent of the base period average. In the alignment of factors responsible for the latest showing, steel mill activity, automobile production, and heavy construction work registered gains, but at Pittsburgh industrial activity remained practically unchanged and, in addition, lumber shipments receded heavily.

While unfavorable climatic conditions continued to be a restrain-

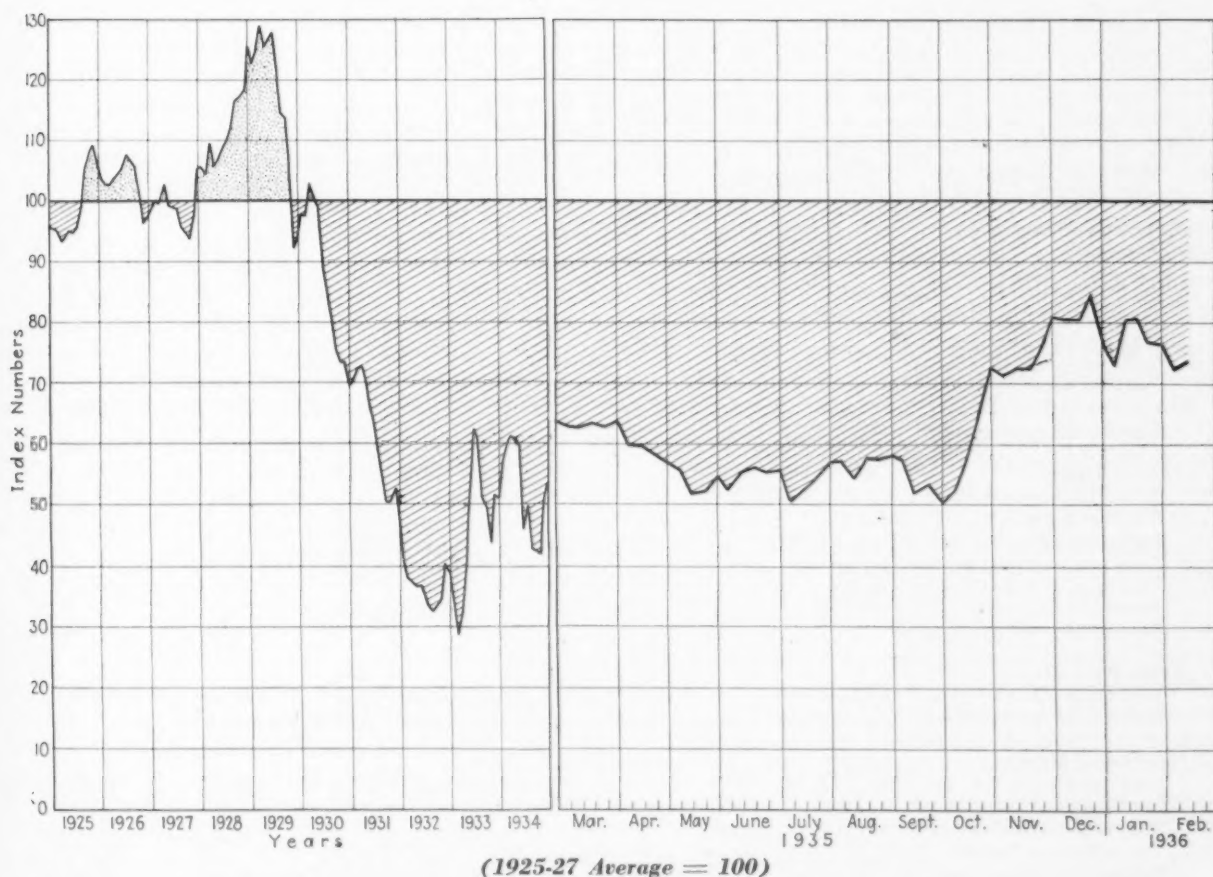
The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-'27 = 100)

Last week (est.)	73.9
Preceding week (rev.)	72.1
Same week last month	80.7
Same week 1935	66.0
Same week 1934	58.4
Same week 1933	33.3
Same week 1932	41.3
Same week 1931	69.3
Same week 1930	98.3
Same week 1929	121.0

ing factor last week, in special cases, as in that of coal shipments included in the Pittsburgh industrial index, the severe weather proved a stimulus. Automobile deliveries were still being retarded last week, but a number of producers stepped up production regardless of this circumstance.

Compared with earlier years, last week's index number is approximately 20 per cent above the comparable 1935 showing, 27 per cent above the same week in 1934, and 79 per cent above the like week in the depression year of 1932.



THE Iron Age Index of Capital Goods Activity. The years 1925 to 1934 are plotted by months, by weeks since 1935.

Components of the index: Steel ingot production rate, from THE IRON AGE; revenue freight carloadings of forest products, from Association of American Railroads; automobile production from Cram's Automotive Reports; heavy construction contract awards, from Engineering News Record; index of productive activity in Pittsburgh district, from Bureau of Business Research of University of Pittsburgh.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	January, 1936	December, 1935	January, 1935	Year 1934	Year 1935
Raw Materials:					
Lake ore consumption (gross tons) ^a	2,951,568	3,100,530	2,280,393	22,113,951	30,848,179
Coke production (net tons) ^b.....	.....	3,488,818	2,889,552	31,821,576	35,209,240
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	2,025,885	2,106,453	1,477,336	15,911,188	21,007,802
Pig iron output—daily (gross tons) ^c	65,351	67,950	47,656	43,592	57,556
Castings:					
Malleable castings—production (net tons) ^d...	.....	45,598	43,400	369,458	466,395
Malleable castings—orders (net tons) ^d.....	.....	42,573	44,568	354,146	452,611
Steel castings—production (net tons) ^d.....	.....	37,793	29,035	450,087	398,988
Steel castings—orders (net tons) ^d.....	.....	40,529	32,349	434,131	400,157
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e ...	3,049,439	3,081,807	2,871,531	25,599,118	33,425,576
Steel ingot production—daily (gross tons) ^e	112,942	123,272	106,353	82,312	107,478
Steel ingot production—per cent of capacity ^e ..	51.18	55.68	48.04	37.38	48.55
Employment in Steel Industry:					
Total employees ^e.....	.....	.....	407,071	409,349	.....
Total payrolls (thousands of dollars) ^e.....	.....	.....	\$44,329	\$457,848	.....
Average hours worked per week ^e.....	.....	.....	33.6	30.4	.....
Finished Steel:					
Trackwork shipments (net tons) ^e	3,366	3,025	2,333	49,110	42,229
Steel rail orders (gross tons) ^e	214,541	88,100	51,000	.....	533,120
Sheet steel sales (net tons) ^f.....	.....	203,318	321,831	1,830,682	2,473,489
Sheet steel production (net tons) ^f.....	.....	208,774	235,714	1,895,460	2,424,990
Fabricated shape orders (net tons) ^g.....	.....	96,235	64,306	1,054,382	1,068,603
Fabricated shape shipments (net tons) ^g.....	.....	76,214	89,627	1,116,222	1,095,216
Fabricated plate orders (net tons) ^d.....	.....	35,584	18,778	241,992	258,315
Reinforcing bar awards (net tons) ^e	67,810	29,025	17,750	182,351	318,340
U. S. Steel Corp'n. shipments (tons) ^h	721,414	661,515	534,055	5,925,873	7,371,299
Ohio River steel shipments (net tons) ⁱ.....	.....	61,666	52,656	633,197	925,174
Fabricated Products:					
Automobile production, U. S. and Canada ^k...	.....	421,579	303,392	2,869,963	4,182,591
Construction contracts, 37 Eastern States ^l	\$204,792,800	\$264,136,500	\$99,773,900	\$1,543,108,400	\$1,844,544,900
Steel barrel shipments (number) ^d.....	.....	541,375	438,334	6,682,400	6,872,452
Steel furniture shipments (dollars) ^d.....	.....	\$1,558,095	\$1,139,497	\$11,807,843	\$15,523,679
Steel boiler orders (sq. ft.) ^d.....	.....	684,735	391,784	4,368,563	6,245,158
Locomotive orders (number) ^m	14	2	0	183	30
Freight car orders (number) ^m	1,050	10,030	24	24,611	18,158
Machine tool index ⁿ	110.8	98.3	65.5	†46.2	†86.0
Foundry equipment index ^o	127.0	118.1	86.6	†60.5	†103.3
Foreign Trade:					
Total iron and steel imports (gross tons) ^p.....	.....	93,678	22,784	316,761	469,954
Imports of pig iron (gross tons) ^p.....	.....	16,289	2,033	115,470	130,937
Imports of all rolled steel (gross tons) ^p.....	.....	21,812	15,054	113,354	216,567
Total iron and steel exports (gross tons) ^p.....	.....	239,269	262,740	2,832,764	3,067,336
Exports of all rolled steel (gross tons) ^p.....	.....	85,590	73,396	951,380	897,749
Exports of finished steel (gross tons) ^p.....	.....	78,625	66,523	833,559	767,456
Exports of scrap (gross tons) ^p.....	.....	142,135	179,630	1,835,554	2,047,290
British Production:					
British pig iron production (gross tons) ^r	595,500	559,300	521,200	5,978,500	6,426,000
British steel ingot production (gross tons) ^r	912,500	811,500	757,800	8,859,700	9,842,400
Non-Ferrous Metals:					
Lead production (net tons) ^s.....	.....	42,020	29,314	412,298	421,764
Lead shipments (net tons) ^s.....	.....	42,333	33,695	379,807	433,456
Zinc production (net tons) ^s	41,826	40,136	35,135	366,933	431,085
Zinc shipments (net tons) ^s	46,468	41,466	35,455	352,663	465,124
Deliveries of tin (gross tons) ^v	6,635	5,360	4,600	46,215	59,110

†Yearly average.

Source of figures: ^aLake Superior Iron Ore Association; ^bBureau of Mines; ^cTHE IRON AGE; ^dBureau of the Census; ^eAmerican Iron and Steel Institute; ^fNational Association of Flat-Rolled Steel Manufacturers; ^gAmerican Institute of Steel Construction; ^hUnited States Steel Corp'n.; ⁱUnited States Engineer, Pittsburgh; ^jWhen preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^kF. W. Dodge Corp'n.; ^lRailway Age; ^mNational Machine Tool Builders Association; ⁿFoundry Equipment Manufacturers Association; ^oDepartment of Commerce; ^pBritish Iron and Steel Federation; ^qAmerican Bureau of Metal Statistics; ^rAmerican Zinc Institute, Inc.; ^sNew York Commodities Exchange.

SUMMARY OF THIS WEEK'S BUSINESS

Continued Bad Weather Fails to Check Rise in Steel Production

Ingot Output This Week Is Half Point Higher at 53½ Per Cent as Demand From Railroads and Building Industry Improves—Scrap Much Higher

WEATHER conditions this week did not check the rise in steel production which began early in the month, and ingot output is up half a point to 53½ per cent of capacity. However, the almost complete tie-up of inland waterway facilities and growing congestion in railroad yards and warehouses are being felt severely and will soon check steel activity unless relief appears.

A hesitant tendency is already noticeable in the country's leading steel-making districts as production is unchanged this week at Pittsburgh, Chicago, Philadelphia and Youngstown. On the other hand, output is up five points to 65 per cent at Birmingham, four points to 80 per cent in the Wheeling district, two points to 66 per cent at Cleveland, two points to 30 per cent at Buffalo and five points to 45 per cent in the West. The gains at Birmingham and in the West are directly attributable to the rolling of rails.

THE feverish activity in the scrap market overshadows other developments this week, as continued freezing weather has finally forced prices to levels entirely inconsistent with current melting rates in either foundries or furnaces. THE IRON AGE composite price of scrap has risen 58c. a gross ton, to \$14.33, the highest figure since April 15, 1930.

In most scrap consuming districts, however, the activity of dealers rather than of mills is responsible for higher prices. Most consumers of scrap ordinarily maintain large stock piles for just such emergencies as this. While they prefer to charge furnaces directly from cars, they also hesitate to press brokers for deliveries and thus help to advance the price structure further.

SCRAP quotations are in direct contrast to finished steel prices, which have given further ground since the first of the month. Products sold through distributors are most seriously affected, but the automobile industry is again pressing for an additional advantage because the \$3 a ton differential it has been allowed on sheet and strip steel is being extended to other buyers.

Price weakness is most pronounced on wire nails and other merchant wire products which are being sold to jobbers and other large buyers at figures \$2 to \$6 under the published market. At Cleveland, distributors are openly quoting the usual mill prices or less. Reinforcing bar quotations are difficult to establish because of the wide ranges offered in public bidding,

but the average price seems to be at least \$4 a ton under the quoted figures.

While the higher prices on semi-finished steel which were announced last fall are not technically in effect, consumers generally have covered their needs through the first quarter and no immediate test will be offered. If these higher prices are held, however, the finished steel market will be placed on a firmer basis and a general reduction in quotations may be avoided. THE IRON AGE composite price of finished steel is unchanged at 2.109c. a lb.

THE railroads and the building industry continue to offer the principal support to this week's steel market. Rail orders of 40,000 tons include 31,000 tons for the Western Pacific. The Missouri Pacific is inquiring for 17,000 tons of rails and 1,000,000 tie plates. Freight car orders include 550 for the Santa Fe and 100 for the Western Pacific. Among new inquiries for freight cars, totaling nearly 3000 units, are 1000 for the New Haven, 1000 for the Northern Pacific, 500 for the Great Northern and 300 for the Missouri Pacific.

The week's fabricated structural steel awards, amounting to 33,215 tons, are the largest in nearly a year and compare with 19,650 tons in the preceding week. New projects, however, declined to 13,600 tons from 25,350 tons in the preceding comparable period. Awards of construction steel reported to THE IRON AGE thus far in the year total 284,302 tons, compared with 205,525 tons in the corresponding 1935 period. The proposed natural gas pipe line from Indiana into Detroit will take 42,000 tons of pipe.

THE trend of automobile production remains highly uncertain and steel buying consequently is definitely limited. A steady volume of releases is reaching mills, but immediate delivery is required and no backlogs can be accumulated. Used car stocks are as serious a problem to the automotive industry as protracted bad weather, as both factors are quickly reflected in sales of new cars.

Pig iron producers have reaffirmed present quotations for second quarter, and as low-priced stocks have been largely liquidated in many districts, current prices should soon begin to be realized on sizable tonnages. A leading seller of iron has introduced a 42-lb. pig which is expected to provide convenience in foundry melting. THE IRON AGE pig iron composite price is unchanged at \$18.84 a gross ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Feb. 18, 1936	Feb. 11, 1936	Jan. 21, 1936	Feb. 19, 1935
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.26
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'tl.....	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham.....	15.50	15.50	15.50	14.50
No. 2 foundry, Chicago*.....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.2528	25.2528	25.2528	24.04
Ferromanganese, seab'd carlots	75.00	75.00	75.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh..	29.00	29.00	29.00	27.00
Sheet bars, Pittsburgh.....	30.00	30.00	30.00	28.00
Slabs, Pittsburgh.....	29.00	29.00	29.00	27.00
Forging billets, Pittsburgh..	35.00	35.00	35.00	32.00
Wire rods, Pittsburgh.....	40.00	40.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grv'd. steel, P'gh, lb..	1.80	1.80	1.80	1.70

Finished Steel

<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Bars, Chicago.....	1.90	1.90	1.90	1.85
Bars, Cleveland.....	1.90	1.90	1.90	1.85
Bars, New York.....	2.20	2.20	2.20	2.13
Plates, Pittsburgh.....	1.80	1.80	1.80	1.80
Plates, Chicago.....	1.85	1.85	1.85	1.85
Plates, New York.....	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago...	1.85	1.85	1.85	1.85
Structural shapes, New York	2.06 1/4	2.06 1/4	2.06 1/4	2.05 1/4
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Finished Steel

	Feb. 18, 1936	Feb. 11, 1936	Jan. 21, 1936	Feb. 19, 1935
<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh...	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary...	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh.....	2.10	2.40	2.40	2.60
Wire nails, Chicago dist. mill	2.15	2.45	2.45	2.65
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., Pittsburgh	2.50	2.80	2.80	3.00
Barbed wire, galv., Chicago dist. mill.....	2.55	2.85	2.85	3.05
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$5.25

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh...	\$14.75	\$14.75	\$14.50	\$13.00
Heavy melting steel, Phila...	13.75	12.75	12.75	11.50
Heavy melting steel, Ch'go...	14.50	13.75	13.50	11.25
Carwheels, Chicago.....	14.00	13.50	13.25	12.00
Carwheels, Philadelphia.....	14.75	14.75	14.75	12.50
No. 1 cast, Pittsburgh.....	14.25	14.25	14.25	13.75
No. 1 cast, Philadelphia.....	13.00	13.00	13.00	11.00
No. 1 cast, Ch'go (net ton)...	13.00	12.50	12.00	10.00
No. 1 RR. wrot., Phila.....	13.25	13.25	13.25	11.00
No. 1 RR. wrot., Ch'go (net)...	13.25	12.50	11.00	9.25

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$3.65	\$3.65	\$3.65	\$3.85
Foundry coke, prompt.....	4.25	4.25	4.25	4.60

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	9.25	9.25	9.25	8.75
Lake copper, New York.....	9.37 1/2	9.37 1/2	9.37 1/2	9.12 1/2
Tin (Straits), New York....	47.75	48.12 1/2	46.87 1/2	50.35
Zinc, East St. Louis.....	4.85	4.85	4.85	3.70
Zinc, New York.....	5.22 1/2	5.22 1/2	5.22 1/2	4.05
Lead, St. Louis.....	4.35	4.35	4.35	3.40
Lead, New York.....	4.50	4.50	4.50	3.55
Antimony (Asiatic), N. Y...	12.87 1/2	12.87 1/2	12.62 1/2	14.50

The Iron Age Composite Prices

Finished Steel

Feb. 18, 1936	2.109c. a Lb.
One week ago	2.109c.
One month ago	2.130c.
One year ago	2.124c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

	HIGH	LOW
1936	2.130c., Jan. 7;	2.109c., Feb. 4
1935	2.130c., Oct. 1;	2.124c., Jan. 8
1934	2.199c., April 24;	2.008c., Jan. 2
1933	2.015c., Oct. 3;	1.867c., April 18
1932	1.977c., Oct. 4;	1.926c., Feb. 2
1931	2.037c., Jan. 13;	1.945c., Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29
1928	2.286c., Dec. 11;	2.217c., July 17
1927	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$18.84 a Gross Ton
18.84
18.84
17.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1936, Jan. 7;	\$18.84	\$18.84
1935, Nov. 5;	18.84	17.83
1934, May 14;	17.90	16.90
1933, Jan. 27;	16.90	13.56
1932, Jan. 3;	14.81	13.56
1931, Dec. 6;	15.90	14.79
1930, Dec. 15;	18.21	15.90
1929, Dec. 16;	18.71	18.21
1928, May 14;	18.59	17.04
1927, July 24;	19.71	17.54

Steel Scrap

\$14.33 a Gross Ton
13.75
13.58
11.92

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1936, Feb. 18;	\$14.33	\$13.33
1935, Jan. 7;	13.42	10.33
1934, April 23;	13.00	9.50
1933, Sept. 25;	12.25	6.75
1932, Jan. 3;	8.50	6.43
1931, July 5;	11.33	8.50
1930, Dec. 29;	15.00	11.25
1929, Dec. 3;	17.58	14.08
1928, Dec. 31;	16.50	13.08
1927, Nov. 22;	15.25	13.08

Pittsburgh and Valley Steel Output Unchanged



Wheeling District Operations Rise
To 80 Per Cent of Capacity—Rail-
road Car Steel Releases Heavy—
Scrap Strong

PITTSBURGH, Feb. 18.—The trend in finished steel demand since mid-February has been slightly irregular. In the past week interest from miscellaneous sources was a shade lighter, while no significant improvement in automotive demand appeared. The movement of steel for construction projects continues to be hampered by prolonged severe weather, which also is depressing shipments of other grades of steel to fabricating plants isolated by snowstorms.

Pittsburgh producers, while operating on slim backlogs, this week are maintaining recent schedules, and ingot output for the district is unchanged at 38 per cent. Mill activity is sustained in no small measure by rolling of railroad car steel against the recent Pennsylvania Railroad orders. In the Valleys and nearby northern Ohio mills, operations likewise are holding their own at 60 per cent of capacity. In the Wheeling district, operations have risen four points to 80 per cent.

Finishing mill schedules are practically unchanged. Some clarifying adjustments in the steel price structure, which is creaking badly under increasing pressure from consumers outside the automotive industry, is under consideration. No definite price policy, however, has been set up at this writing. Concessions on sheets and strip are widespread, despite efforts of sellers to isolate price inducements to the Detroit area. The advances on semi-finished grades announced last fall remain purely nominal, and there is increasing evidence that the new prices will not be put to a test this quarter.

Pig Iron

Consumers are still working off stocks of low-priced iron accumulated in December, and at the relatively moderate rate of melt prevailing at most foundries replenishments on a large scale do not appear to be imperative this month. Of course, reciprocal business and conversion arrangements continue to affect a veritable lion's share of tonnage in this market.

Semi-Finished Steel

This market temporarily seems to be in a muddle so far as what non-integrated mills will be expected to pay for semi-finished grades shipped this week. It had been generally understood that Feb. 15 would be the deadline for material released against old low-priced contracts. Some consumers, however, still are exploiting their intentions to shop around for material at unchanged prices to take care of their remaining requirements for first quarter. On the other hand, some producers have indicated that the new prices established last fall will be uniformly applicable for the remainder of first quarter. In special instances some consumers have closed arrangements to take care of their entire quarterly requirements at the old bases. Sheet bar stocks probably are heavier than those of other grades.

Bars

Demand in February has been disappointing from a standpoint of comparison with January tonnage. The loss in volume is clearly attributable to reduced activity in the automobile industry. Orders from miscellaneous sources, while not so insistent, are appearing with encouraging regularity. Paralyzed shipping facilities at some mid-Western consuming points are naturally deterring shipments. While concessions continue to rule on large tonnages, there is increasing evidence of efforts to stabilize prices in vulnerable districts.

Rails and Track Accessories

Only about 2000 tons of the New York Central Railroad's recent rail awards will be rolled at the local rail mill. Backlogs of rail tonnage are practically nil, while producers of accessories do not find it at all difficult to fulfill present commitments.

Bolts, Nuts and Rivets

February business is on a parity with January volume. Orders from car builders engaged on the Penn-

sylvania Railroad contracts are particularly helpful in sustaining activity. From 700 lb. to 1500 lb. per car of bolts, nuts and rivets will be required for the Bessemer & Lake Erie and Union Railroad cars, some material for which will likely be purchased after the turn of the month.

Reinforcing Steel

Producers are focusing attention chiefly on the opening of bids for the Fort Peck Dam tunnels on Feb. 21. Local awards and new specifications are insignificant by comparison. The Pennsylvania Highway Department is taking bids on a small aggregate tonnage of reinforcing bars for road work in Susquehanna, Tioga and Delaware counties. Distributors' prices remain irregular.

Cold-Finished Bars

Demand has slumped rather badly since Feb. 1. The present paucity of orders is laid chiefly to heavy January shipments and a recession in automotive demand. While miscellaneous business has not diminished seriously, renewed automotive activity practically holds the key to further important buying in this market. Base prices appear to have withstood the brunt of pressure sponsored by reported weakness in hot-rolled bar quotations.

Tubular Goods

About 42,000 tons of 22-in. welded pipe is estimated to be the requirements for the natural gas line from Dana, Ind., to Indianapolis and Detroit. Bids are expected to be taken within a week, depending upon the proposal of Columbia Gas & Electric Co. to reorganize a subsidiary, the Panhandle Eastern Pipe Line Co. The pipe market, on a whole, remains unusually steady, despite severe weather in some districts. Oil-country goods are moving at a fairly regular pace. Mechanical tubing is suffering from reduced automotive production.

Sheet Steel Piling

The United States Engineer Office at Galveston, Texas, will take contractors' bids on Feb. 21 covering a maximum of about 1900 tons for 13 groins. General demand has been dulled by a semi-paralysis of construction work in areas affected by freezing weather. Prices being bid on most projects represent a fairly uniform adherence to the published base quotation.

Wire Products

Reduced demand is largely a reflection of a diminution of automotive orders for manufacturers and spring wire. Severe weather has

laid a half stymie on shipments to agricultural areas. In other districts wire nail prices remain extremely irregular, but some steps are ready to be taken to overcome some of the present weakness. At this writing, however, there seems to be no general price policy affecting wire nails.

Sheets

While aggregate demand in the past week receded slightly, small backlogs are sufficient to sustain operations at around 65 per cent of capacity in the current period. Orders for automobile sheets held a slight edge over miscellaneous business last week, but this condition is not considered to signify a resumption of automotive buying on a broad scale. What automobile business was placed represented imperative fill-in needs. Spreading weakness in prices is a topic of serious concern. Concessions of \$3 a ton seem to be a generally accepted fact in many districts, but cuts of \$5 a ton have been isolated to special cases entailing large tonnages.

Tin Plate

Demand and production are fairly well in balance, with output holding at 65 per cent of capacity. General line can and packers' requirements are the chief supports in the current market. Demand for "beer plate" is in a seasonal slump. At some units, cold-reducing mills are running well ahead of hot mill schedules.

Strip Steel

Specifications are coming through at a slow rate that is paced largely by automotive demand. While reductions in takings by other consuming groups are not so drastic, nevertheless the general trend seems to be downward. Fluctuations in hot-rolled schedules are in greater evidence,

but this week's average output is rated unchanged at 40 per cent of capacity, with a strong likelihood of a slightly lower rate to prevail at the close of the period.

Coal and Coke

Demand for domestic fuel in the past week was so insistent, owing to the continued cold spell, that the mining union cast aside contract provisions and urged miners to work six days. The resultant increased production led to a slightly easier condition in this market. Demand from the West and Northwest still is strong, but in the immediate districts movement of fuel has noticeably relaxed. Thaw on the local rivers, moreover, has reverted some emergency rail and truck traffic back to barge shipment. Interest in the East has improved. Foundry coke shipments are proceeding in rather small volume, while furnace coke, which finds a negligible demand for blast furnace consumption, is being utilized chiefly for heating purposes. Prices have not lost some of the recent strength sponsored by severe weather and emergency demand.

Plates and Shapes

The major portion of the plates and shapes for the Bessemer & Lake Erie and Union railroad cars will be rolled in the Pittsburgh district. Steel orders for this work have not yet been placed by the car builders. Releases for Pennsylvania Railroad cars still are not heavy. Ice jams in the local rivers are holding up river transportation, with a result that barge repairs and new barge construction are proceeding rather slowly. The American Bridge Co. has been awarded contract covering 3350 tons of structural steel for Torrence Avenue bridge at Chicago. Other awards reported here for the past week were in unimportant

volume. New projects were the slimmest in some weeks. The Pittsburgh base of 1.80c. per lb. for plates has been shaded \$2 a ton. Fabricated structural steel prices remain highly competitive.

Scrap

The weather still is the dominating influence in this market. Water movement of scrap is practically at a standstill, while rail shipments are not moving any too freely during the recurring snowstorms in this district. Scrap, consequently, is available in relatively small quantities, and dealers are bidding up prices in order to cover unfilled orders. Mills, on the other hand, are not pressing for deliveries. Prices remain strong. Railroad and low phosphorus specialties are notably buoyant, with quotations for these grades averaging 25c. a ton higher. Compressed sheet steel for a nearby point in Ohio is being covered by a dealer at \$15.50 delivered. The Pennsylvania Railroad steel on the last list is reported to have been sold at \$16, delivered in the Wheeling district, where frozen rivers have seriously interfered with barge deliveries of scrap.

Steel Output Higher In Birmingham District

BIRMINGHAM, Feb. 18. — This week 15 open-hearth units will be operated in the district, an increase of one over last week, and the largest number since July, 1931, with two brief exceptions in May and June, 1934. The increase is at the Fairfield works of the Tennessee Coal, Iron & Railroad Co., where 8 out of 9 are active. Three units continue at the Ensley works of the Tennessee company and four at the Alabama City

Weekly Indications of Steel Activity

FROM THE IRON AGE

	Feb. 18, 1936	Feb. 11, 1936	Jan. 21, 1936	Feb. 19, 1935	Average Year to Date	
					1936	1935
Steel ingot operations—Per cent of capacity	53.5	53.0	51.0	50.5	51.3	50.7
	Week Ended				Year to Date	
	Feb. 18, 1936	Feb. 11, 1936	Jan. 21, 1936	Feb. 19, 1935	1936	1935
Fabricated structural steel awards.....	33,215	19,650	13,950	13,250	149,835	107,905
Fabricated plate awards.....	1,945	7,835	1,400	700	55,802	43,505
Sheet steel piling awards.....	0	2,760	0	0	6,360	4,300
Reinforcing bar awards.....	3,100	3,260	8,300	12,800	72,305	49,815

works of the Gulf States Steel Co.

Blast furnace operations are unchanged, with twelve stacks in blast. The Tennessee company has six, while Woodward Iron, Sloss-Sheffield Steel & Iron and Republic Steel Corp. each have two.

There is not much activity in the pig iron market, as current foundry requirements have already been booked to a large extent.

Demand for wire products and sheets is still hampered by bad weather. December stocking by dealers and jobbers is also a factor as these stocks have been moving slowly, due likewise to bad weather. Bar, plate and structural business is gradually growing better and bookings showed an increase last week.

Cast Iron Pipe

Procurement Division of the Treasury, New York, has placed 406 tons of 6 to 12-in. with Warren Foundry & Pipe Corp.

New York Department of Water Supply, Gas & Electricity, has placed 100 tons of 6 to 20-in. with Warren Foundry & Pipe Corp.

Scanlon, Minn., plans pipe lines for water system, with main trunk line from Cloquet, Minn., where supply will be secured. Fund of \$25,000 has been arranged.

Jackson, N. C., plans pipe lines for water system and other waterworks installation, bids to be asked early in March. Spoon & Lewis, Greensboro, N. C., are consulting engineers.

Board of District Commissioners, District Building, Washington, asks bids until Feb. 26 for 40,000 ft. of 8-in., bell and spigot, and for 34 tons of cast iron water pipe specials.

Lock Haven, Pa., closes bids March 2 for pipe for water system; also for chlorination plant and other waterworks installation. Financing has been arranged through Federal aid. G. M. Busch, Jr., 112 West Fourth Street, Williamsport, Pa., is consulting engineer.

State Building Commission, Capitol Building, Jefferson City, Mo., plans pipe lines for water system in connection with new water supply for State penitentiary. Cost about \$100,000. W. D. Weidlein & Co., Fairfax Building, Kansas City, Mo., are consulting engineers; Charles A. Haskins, Finance Building, Kansas City, Mo., is supervising engineer.

Milton, N. C., plans pipe lines for water system. Financing is being arranged.

Oil City, Pa., plans pipe lines for water system, including two main 12-in. lines across Allegheny River for trunk service. B. B. Webber is city engineer.

Blue Mountain, Miss., has called special election Feb. 28 to approve bonds for \$22,000, to which Federal grant will be added, for pipe lines for water system and other waterworks installation.

Concord, N. C., through Federal aid, has arranged fund of \$183,000 for pipe lines and other waterworks installation.

Montesano, Wash., plans pipe lines for water system in Central Park area. Cost about \$50,000 with other waterworks installation.

Glens Falls, N. Y., has arranged fund of \$145,000 for pipe lines and other waterworks installation, including pumping station.

Mount Pleasant, S. C., has secured appropriation of \$87,000 through Federal aid

EXPERIENCE makes SPRINGS

Send your "Springquiries"

to



Quality Springs
since 1845

DUNBAR BROS. CO.
BRISTOL CONNECTICUT

for water pipe and other waterworks installation, and sewage system.

Lynchburg, Va., is arranging bond issue of \$350,000 for main pipe line from Pedlar River for water system, replacing present gravity pipe line. Richard F. Wagner is engineer.

West Point, Neb., has arranged Federal financing for pipe lines for water system and plans early installation. Nixon & Reynolds, Grain Exchange Building, Omaha, Neb., are consulting engineers.

Seattle, Wash., plans 8 and 16-in. pipe for water supply in different streets. Cost about \$45,000. T. R. Beeman, City-County Building, is engineer.

San Francisco has opened bids on 717 tons on which United States Pipe & Foundry Co. is low bidder.

San Francisco Office of Treasury Department let 175 tons to Pacific States Cast Iron Pipe Co.

Navy Department has let contract to United States Pipe & Foundry Co. for 215 tons of 6 to 12-in. for Pearl Harbor, T. H.

required for the possible future needs of the corporation.

The principal new construction called for in the program is a strip and sheet mill to be erected in the Pittsburgh works at an estimated cost of \$25,000,000, marking the entry of Jones & Laughlin into this important line of consumer products. This new mill will be started at once, on a site in the company's present works along Second Avenue in Pittsburgh and is scheduled to be completed within one year. Employment will be given to several thousand men in the construction and operation of this new mill and other improvements included in the program.

Included in the purposes of the new \$40,000,000 financing, in addition to \$25,000,000 for the new strip and sheet mill, are provisions for working capital required for reimbursement of expenditures already made and yet to be made for the \$5,000,000 electrically driven 44-inch blooming mill in the Pittsburgh works, already well under construction; also \$1,500,000 for additions and improvements to the four-high cold reducing mill in the Aliquippa works, \$3,000,000 for capital expenditures already made and shortly to be made and for other working capital requirements. At the same time, it is proposed to retire the present \$5,248,000 of bonds outstanding from an issue of \$30,000,000 authorized in 1909, but of which only \$25,000,000 was issued and sold.

J. & L. Shareholders Approve Financing

A SPECIAL meeting of shareholders of the Jones & Laughlin Steel Corp. at Pittsburgh on Feb. 14 approved the creation of a \$100,000,000 first mortgage upon the properties of the corporation and certain of its subsidiaries, under which it is proposed to issue and sell at this time bonds to the amount of \$40,000,000, chiefly for new steel mills and other improvements. The remainder of the bonds is to be available for issuance, if

Weather Conditions Still Hamper Chicago Demand



Steel Production Holds at 60 Per
Cent as Railroad Buying Continues
—Scrap Famine Looms With Prices
Higher

CHICAGO, Feb. 18.—Ingot output is holding steady at 60 per cent of capacity, despite difficulties attendant to deliveries in extreme cold weather. Delays of 10 days on shipments from Chicago to Milwaukee are not uncommon and practically all outdoor work is at a standstill.

The matter of adequate railroad equipment is not troublesome except as it is concerned with the movement of coal and coke which indirectly affect steel consumption where plants have had to conserve fuel, and in some cases divide it with employees for home consumption.

The whole subject of weather is closely allied with the scrap market in which prices are advancing and lost working time in preparation yards, as well as inability of melters to dig out their own piles, is resulting in a condition that is not far from famine.

Scrap prices are moving contrary to the tendency of some finished steel prices. Nails and reinforcing bars are lower and there is some unsteadiness in sheet mill products.

Railroad equipment purchases and inquiries still give excellent support to mills, and fabricating shops, though handicapped in shipping materials, are still drawing in good volume from mills. Many users of steel, such as automobile seat and back spring makers, cannot now make use of additional steel but they are cautioning producers to have mill stocks of ample size to meet the rush which they foresee as a result of the pent-up demand of the extreme winter months.

Pig Iron

Shipments are moving steadily from producers' plants but delays are common between seller and user because of the railroads inability to hold schedules. So far, obtaining railroad equipment has not been a serious handicap, but today railroads admit that the situation is fast becoming serious

and needed equipment can no longer be guaranteed.

Coke

Orders are reaching ovens in increasing numbers, while shortage of railroad equipment, as well as slow movement en route, are handicaps to foundry operations in some sections.

Rails

Activity in this market is centered south and west of Chicago where attractive tonnages have been placed. The Western Pacific has ordered 31,000 tons, 10,000 tons from Pacific Coast mills and 21,000 tons from the Colorado unit. The Mobile & Ohio, the St. Louis-San Francisco and the Atlantic Coast Line have placed an aggregate of 23,900 tons with the Tennessee company and the Western Maryland has divided 3000 tons between Carnegie-Illinois and Bethlehem. Determination of exact specifications is holding back the Milwaukee Road's orders. Potential buyers from Chicago mills are the Monon and the Chicago & Eastern Illinois.

Plates

Railroad car orders and inquiries plus about 3000 tons of pipe placed by the Metropolitan Water District of Los Angeles give additional life to plates which are once again beginning to take their rightful place among the other heavy tonnage products. The Santa Fe has placed 550 cars and the Western Pacific has ordered 100 ballast cars. The Northern Pacific will purchase 750 cars and the Great Northern is in the market for 500 ore cars. There is also more activity in the locomotive market and railroad shops are busier, not alone on repair work, but also on new construction.

Bars

Continued cold and snow are now keenly felt at bar mills, not only because deliveries are difficult to make, but because many outlying plants are faced with fuel shortage and production has been curtailed. Further, the weather is

still considered a major deterrent to automobile sales. Road machinery manufacturers are slow to respond to the approach of spring, but it is probable that they, as will others who depend on out-of-doors construction, will see this year's programs delayed a month or more. Agricultural implement manufacturers see no obstacles in their way and their output remains steady.

Sheets

The picture of this market remains unchanged except in so far as the weather has cut demand or retarded activities that should be growing at this time. Jobbers are finding distribution difficult and out-of-doors work is almost at a standstill. Price weakness that has centered more or less at Detroit is now spreading and irregularities are appearing locally.

Wire Products

It is estimated that cold weather and snow have set back the jobbing trade at least 30 days. Another effect of the weather is that of coal shortages which are hampering operations in outlying plants. Hold-up orders are coming from automobile parts makers who caution producers to be ready to ship on very short notice. Wire sellers recognize the piling up of this potential demand which will break with return of normal seasonable weather and they are holding operations and adding to their stocks.

Structural Material

Mills report that specifications from fabricators are heavier and shops say that bookings are steady with prospect of growth in the near future. One fabricator estimates that about 50 per cent of the business that he can see ahead will be undertaken by private capital. Formal contract has been closed for the 3300 tons for the Torrence Avenue bridge, Chicago, and a 6500-ton hall at Kansas City has been given to an unnamed bidder.

Cast Iron Pipe

Buyers' interest is still confined to odd lots which are seldom for more than one or two carloads. The outlook for spring buying in large quantities is not as tangible as sellers would like to see it. There is much talk about plans but few definite projects have progressed to the point where they seem to be assured. Prices are on a very firm footing.

Reinforcing Bars

Both new orders and fresh inquiries are at a fair level considering the time of year and the severity of the weather during the past three weeks. New work in

sight holds more promise and better weather will permit shops to resume shipments on a large scale so the trade feels somewhat more optimistic. Flood control work in Iowa will take 900 tons and there is promise of a large tonnage for completion of the Outer Drive in Chicago. There is more work to be done on the Mississippi River but heavy snow foretells serious spring floods and that work may be delayed.

Scrap

Prices are rushing upward under the urge of limited supplies resulting from cold weather. Mills also have a preference for using scrap from cars rather than from their own piles and dealers, in an extremely short position, are scrambling for every ton that is offered. Yards have lost 30 days of work that cannot be regained, and, in the meantime, mill operations have climbed and give promise of going to still higher levels. If they do, it will probably offset a softening effect that might be expected from moderation of the weather. Railroads are now having no difficulty in getting over \$15 a ton for heavy melting steel.

Railroad Equipment

ORDERS have been placed for 31 locomotives of various types, including 10 diesel switch engines, one streamlined Hiawatha type locomotive, five locomotives for export and 15 other locomotives. Rail orders amount to 42,335 tons. A single order by Western Pacific of 31,000 tons divided between two companies accounted for most of this figure. Inquiries are also on hand for 17,000 tons of rails and 1,000,000 tie plates. Reconditioning of 88 passenger cars is being undertaken and 25 tank cars, 500 box cars, 50 hopper cars and 1000 freight cars have been ordered. Inquiries have been made for 1000 box cars, 500 gondolas, 500 ore cars and 250 flat cars.

New York, New Haven & Hartford has been granted permission by Federal court to purchase 10 Diesel switching engines, five from Ingersoll-Rand Co. and five from Cooper-Bessemer Co. at \$65,000 each, to replace 15 obsolete light switching engines. Motive power in new streamlined coaches will be installed at a cost of \$35,000, and 88 passenger cars will be air conditioned, this work to be divided among Safety Car Heating & Lighting Co., B. F. Sturtevant Co. and Pullman-Standard Car & Mfg. Co. This railroad is also inquiring for 1000 box cars and 50 coaches.

Missouri Pacific has been authorized to purchase 300 steel-body box cars, at a cost of about \$702,300, for the International-Great Northern, to be paid for out of revenues of that subsidiary. Parent company also was authorized to expend \$84,750 for installing automobile loading devices in cars.

PERFORATED METALS..
FOR EVERY PURPOSE

Plain and Ornamental Perforations in a great variety of sizes and styles, made in any metal.
Excellence of product and low prices.

The Harrington & King
PERFORATING CO.

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK

Inland Steel Co. is asking for three 0-6-0 switching engines.

Interoceanic Railway of Mexico has placed an order for five locomotives of 2-8-0 type with American Locomotive Co.

Milwaukee Road has placed an order with American Locomotive Co. for one streamlined engine of Hiawatha type, and will build in its own shops five baggage and five mail-express cars of welded steel construction.

Phillips Petroleum Co. has purchased 10 tank cars from General American Tank Car Corp.

Shell Chemical Co. of California has bought 15 8000-gal. tank cars from General American Tank Car Corp.

Santa Fe has ordered 500 box cars from Pullman-Standard Car & Mfg. Co. and 50 70-ton hopper cars from American Car & Foundry Co.

Northern Pacific is inquiring for 500 gondola and 250 flat cars and will build 250 stock cars in its own shops.

Great Northern is inquiring for 500 ore cars.

Union Pacific has ordered 15 locomotives from American Locomotive Co.

RAILS AND TRACK SUPPLIES

Mobile & Ohio has placed 700 tons of 90-lb. rails with Tennessee Coal, Iron & Railroad Co.

Western Maryland has ordered 1500 tons of rails each from Bethlehem Steel Corp. and Carnegie-Illinois Steel Corp.

Western Pacific has placed 10,000 tons of rails with Columbia Steel Co. and 21,000 tons with Colorado Fuel & Iron Co.

Gulf, Mobile & Northern ordered 3000 tons of rails from Tennessee Coal, Iron & Railroad Co.

Missouri Pacific has issued inquiries for about 17,000 tons of 90 and 112-lb. rails and approximately 1,000,000 tie plates.

Brazilian Government has ordered 3000 tons of rails from United States Steel Products Co.

Los Angeles, 135 tons, track extension for Los Angeles Municipal Terminal Railroad, Specification No. 950; bids opened.

St. Louis-Southwestern has ordered 1500 tons of rails, 1000 tons from Carnegie-Illinois Steel Corp. and 500 tons from Bethlehem Steel Corp.

Reinforcing Steel

Awards 3100 Tons—New Projects 15,550 Tons

AWARDS

Chicago, 100 tons, public school building, to Concrete Engineering Co.

Chicago, 150 tons, public school building, to O. J. Dean & Co.

Ogle County, Ill., 100 tons, bridge, to Calumet Steel Co.

Rockford, Ill., 500 tons, sewer project, to Concrete Engineering Co.

Rockford, Ill., 100 tons, sewer project, to W. J. Holiday Co.

Fremont County, Wyo., 137 tons, seven State bridges on Dubois-Riverton highway, to Concrete Steel Engineering Co.

Fremont County, Colo., 133 tons, State bridge between Salida and Canyon City, to an unnamed bidder.

Carson City, Nev., 100 tons, library and court house, to Gunn, Carle Co.

Los Angeles, 715 tons, State overhead crossing at Figueroa Street, to Concrete Engineering Co.

San Francisco, 350 tons, Central pumps reservoir, to Concrete Engineering Co.

San Francisco, 175 tons, 75-in. reinforced concrete pipe for Treasury Department, to Columbia Steel Co.

Tacoma, Wash., 100 tons, bottling plant, to Northwest Steel Rolling Mills.

Rock Island, Wash., 110 tons, fishways, to Bethlehem Steel Corp.

Seattle, 130 tons, addition to Continental Can Co. plant, to Bethlehem Steel Corp.

Sedro-Woolley, Wash., 175 tons, addition to hospital, to Northwest Steel Rolling Mills.

NEW REINFORCING BAR PROJECTS

Kokomo, Ind., 100 tons, court house.

Chicago, tonnage being estimated, Randolph Street viaduct.

Chicago, 300 tons, public school buildings.

Council Bluffs, Iowa, 900 tons, flood relief.

Milwaukee, 235 tons, Rawson-Howell overhead, general contract let to Worden-Allen Co.

La Crosse, Wis., 150 tons, Medary overhead; general contract let to Worden-Allen Co.

Kansas City, Mo., 1700 tons, intercity viaduct; bids to be asked separately Feb. 22 by Kansas and Missouri State Highway Commissions.

Fulton, Mo., 150 tons, ward building for State hospital No. 1; John Epple Construction Co., St. Louis, low bidder on general contract.

Fort Peck, Mont., 8553 tons, material for tunnel work; bids Feb. 21 at Kansas City office of United States Engineers.

San Mateo, Cal., 1400 tons, State livestock building; new bids March 10 on segregated units.

Sausalito, Cal., 100 tons, yacht harbor; second bids rejected.

Los Angeles, 185 tons, material for Treasury Department; bids opened Feb. 17.

Visalia, Cal., 100 tons, city hospital; bids opened.

San Diego, Cal., 180 tons, material for Treasury Department for use at Civic Center; bids opened.

Santa Barbara, Cal., 150 tons, post office; Sarver & Zoss general contractors.

Long Beach, Cal., 100 tons, Veterans Memorial hospital; bids opened.

Portland, Ore., 740 tons, Montgomery Ward building; Guy F. Atkinson, general contractor.

Seattle, 650 tons, chemistry building at University of Washington; South Construction & Engineering Co., general contractor.

Los Angeles, 340 tons additional for Eagle plant on Colorado River aqueduct; bids March 13.

Now that the United States has trains made almost entirely of stainless steel, it is interesting to notice the extent to which stainless has been used for that purpose in England. The "Silver Fox," a locomotive made particularly for the Silver Jubilee express service between Newcastle and London, has made use of this metal more than any other British locomotive yet built. Lagging bands, hand rails, exhaust pipe, window beading and frames, and connecting and eccentric rod covers all are made of stainless steel as is the figure of a fox on the side of the locomotive, from which it takes its name.

Increased Activity in British Mills Still Fails to Meet Demand

LONDON, Feb. 17 (By Cable).—Seven additional blast furnaces were started in January and three more are preparing to start, but still further expansion will be necessary to overtake demand. Domestic deliveries are curtailed and export sales have been suspended.

Increased imports of Continental semi-finished steel are relieving the shortage slightly but British makers are fully booked up to the end of March. Steel consumption, especially in ship building and structural is growing and heavier calls are anticipated when Government rearmament plans mature. Future buying is affected by price uncertainty.

Tin plate bookings are below current production but deliveries are heavy and output is being maintained at 55 to 60 per cent of capacity.

Continental iron and steel is livelier as foreign customers are beginning to cover spring requirements.

The Continental price of semi-finished steel for English market has advanced two shilling six pence sterling for March and April delivery. Belgian home prices have advanced.

Erection of a new Indian steel works is being negotiated in which all Indian steel interests would be associated.

United Kingdom January exports of pig iron were 6700 tons, none of

which was shipped to United States. Total exports of iron and steel were 164,800 tons.

Schwab Expresses Confidence in Future

CHARLES M. SCHWAB, chairman of the board of Bethlehem Steel Corp., in a statement made upon the occasion of his seventy-fourth birthday, on Feb. 18, stressed his confidence in the industrial future of this country, and reviewed the immediate experiences of the past.

Mr. Schwab stated that "one of the inspiring things which has come out of our recent experience has been the earnestness on the part of business management to conduct the affairs of business in the public interest."

Using his own company as an example, Mr. Schwab pointed to the recent suit instigated against Bethlehem's shipbuilding interests in the Federal Court at Philadelphia. The suit was decided in the company's favor, and Mr. Schwab, when queried upon this point, asserted that, even if his company did make the unconscionable profits its adversaries have claimed, nevertheless the ships built by Bethlehem cost the Government less than the ships it obtained from other sources.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hearth	£5 10s. to £5 15s.
Tin plate, per base box	18s. 9d. to 19s. 3½d.
Steel bars, open-hearth	£7 17½s.
Beams, open-hearth	£7 12½s.
Channels, open-hearth	£7 17½s.
Angles, open-hearth	£7 12½s.
Black sheets, No. 24 gage	£9 15s.
Galvanized sheets, No. 24 gage	£11 15s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 5s.
Sheet bars	£2 8s.
Plate, ¼ in. and up	£4 6s. 6d.
Plate, 3/16 in. and 5 mm.	£4 8s. 8d.
Sheets, ¼ in.	£4 9s. 8d.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.	£8 15s.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.85c
F.o.b. Chicago	1.90c
F.o.b. Gary	1.90c
F.o.b. Duluth	2.00c
Del'd Detroit	2.00c
F.o.b. Cleveland	1.95c
F.o.b. Buffalo	1.95c
Del'd Philadelphia	2.10c
Del'd New York	2.20c
F.o.b. Birmingham	2.00c
F.o.b. cars dock Gulf ports	2.25c
F.o.b. cars dock Pacific ports	2.40c

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c
F.o.b. Chicago	1.75c
F.o.b. Gary	1.75c
F.o.b. Moline, Ill.	1.75c
F.o.b. Cleveland	1.75c
F.o.b. Buffalo	1.80c
F.o.b. Birmingham	1.85c
F.o.b. cars dock Gulf ports	2.10c
F.o.b. cars dock Pacific ports	2.25c

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.85c to 2.05c
F.o.b. Chicago	1.90c to 2.10c
F.o.b. Gary	1.90c to 2.10c
Del'd Detroit	2.00c to 2.20c
F.o.b. Cleveland	1.90c to 2.10c
F.o.b. Youngstown	1.90c to 2.10c
F.o.b. Buffalo	1.90c to 2.10c
F.o.b. Birmingham	1.90c to 2.10c
F.o.b. cars dock Gulf ports	2.45c
F.o.b. cars dock Pacific ports	2.45c

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.75c to 1.95c
F.o.b. Chicago	1.75c to 1.95c
F.o.b. Gary	1.75c to 1.95c
F.o.b. Cleveland	1.75c to 1.95c
F.o.b. Youngstown	1.75c to 1.95c
F.o.b. Buffalo	1.75c to 1.95c
F.o.b. Birmingham	1.75c to 1.95c
F.o.b. cars dock Gulf ports	2.30c
F.o.b. cars dock Pacific ports	2.30c

Iron

F.o.b. Chicago	1.80c
F.o.b. Pittsburgh (refined)	2.10c
Delivered New York	2.05c
Delivered Philadelphia	2.10c

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.10c
F.o.b. Chicago	2.15c
F.o.b. Gary	2.15c
F.o.b. Cleveland	2.15c
F.o.b. Buffalo	2.20c
Del'd Detroit	2.30c
Del'd eastern Michigan	2.35c

* In quantities of 10,000 to 19,999 lb.

Fence and Sign Posts

Angle Line Posts

	Base per Net Ton
F.o.b. Pittsburgh	\$54.00
F.o.b. Chicago	54.00
F.o.b. Duluth	55.00
F.o.b. Cleveland	54.00
F.o.b. Birmingham	54.00
F.o.b. Houston, Orange, Beaumont, Galveston	57.00
F.o.b. Mobile	63.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	62.00
F.o.b. cars dock Pacific ports	63.00
	67.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c
F.o.b. Chicago	1.85c
F.o.b. Gary	1.85c
Del'd Cleveland	1.95c
F.o.b. Coatesville	1.90c
F.o.b. Sparrows Point	1.90c
Del'd Philadelphia	1.95c
Del'd New York	2.09c
F.o.b. Birmingham	1.95c
F.o.b. cars dock Gulf ports	2.20c
F.o.b. cars dock Pacific ports	2.35c
Wrought iron plates, f.o.b. P'gh.	3.20c

Floor Plates

F.o.b. Pittsburgh	3.35c
F.o.b. Chicago	3.40c
F.o.b. Coatesville	3.45c
F.o.b. cars dock Gulf ports	3.75c
F.o.b. cars dock Pacific ports	3.90c

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c
F.o.b. Chicago	1.85c
Del'd Cleveland	1.995c
F.o.b. Buffalo	1.90c
F.o.b. Bethlehem	1.90c
Del'd Philadelphia	2.015c
Del'd New York	2.0625c
F.o.b. Birmingham (standard)	1.95c
F.o.b. cars dock Gulf ports	2.20c
F.o.b. cars dock Pacific ports	2.35c

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.	
No. 10, f.o.b.	Pittsburgh .....1.85c.
No. 10, f.o.b.	Gary .....1.95c.
No. 10, del'd	Detroit .....2.05c.
No. 10, del'd	Phila. ....2.16c.
No. 10, f.o.b.	Birmingham .....2.00c.
No. 10, f.o.b.	cars dock Pacific ports.2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c
No. 24, f.o.b. Gary	2.50c
No. 24, del'd Detroit	2.60c
No. 24, del'd Phila.	2.71c
No. 24, f.o.b. Birmingham	2.55c
No. 24, f.o.b. cars dock Pacific ports	3.05c
No. 24, wrought iron, Pittsburgh	4.30c

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c
No. 10 gage, f.o.b. Gary	2.60c
No. 10 gage, f.o.b. Detroit	2.55c to 2.70c
No. 10 gage, del'd Phila.	2.81c
No. 10 gage, f.o.b. Birmingham	2.65c
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c
No. 20 gage, f.o.b. Gary	3.05c
No. 20 gage, del'd Detroit	3.00c to 3.15c
No. 20 gage, del'd Phila.	3.26c
No. 20 gage, f.o.b. Birmingham	3.10c
No. 20 f.o.b. cars dock Pacific ports	3.50c

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.10c
No. 24, f.o.b. Gary	3.20c
No. 24, del'd Phila.	3.41c
No. 24, f.o.b. Birmingham	3.25c
No. 24, f.o.b. cars dock Pacific ports	3.70c
No. 24, wrought iron, Pittsburgh	4.95c

Long Termes

No. 24, unassorted 8-lb. coating	3.40c
F.o.b. Gary	3.50c
F.o.b. cars dock Pacific ports	4.10c

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c
No. 20, f.o.b. Gary	3.20c
No. 20, f.o.b. Birmingham	3.70c
No. 20, f.o.b. cars dock Pacific ports	3.70c
No. 10, f.o.b. Pittsburgh	3.50c
No. 10, f.o.b. Gary	3.60c
No. 10, f.o.b. Birmingham	3.10c
No. 10, f.o.b. cars dock Pacific ports	3.10c

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c
No. 28, Gary	2.85c
No. 28, cars dock Pacific Coast	3.35c

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 In.

	Base per Lb.
All widths up to 24 in., P'gh.....	1.85c.
All widths up to 24 in., Chicago.....	1.95c.
All widths up to 24 in., del'd De- troit	2.05c.
All widths up to 24 in., Birming- ham	2.00c.
Cooperage stock, Pittsburgh	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

	Base per Lb
F.o.b. Pittsburgh	2.60c
F.o.b. Cleveland	2.60c
Del'd Chicago	2.895c
F.o.b. Worcester	2.80c

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c
No. 14, Worcester	3.30c
No. 20, Pittsburgh or Cleveland	3.30c
No. 20, Worcester	3.70c

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	Per. Lb.
Bright wire	2.30c
Spring wire	2.90c

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	\$2.10 to \$2.40
Smooth coated nails	2.10 to 2.40

Base per 100 Lb.

Annealed fence wire	\$2.15 to \$2.45
Galvanized fence wire	2.50 to 2.80
Polished staples	2.80 to 3.10
Galvanized staples	3.05 to 3.35
Barbed wire, galvanized	2.50 to 2.80
Twisted barless wire	2.50 to 2.80
Woven wire fence, base column	61.00
Single loop bale ties, base column	53.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh, and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh, while Pacific Coast prices are \$8 over Pittsburgh. Exception: fence wire Pacific Coast prices are \$11 a ton above Pittsburgh.

On staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	45¢
F.o.b. Chicago	43½¢

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Inches	Steel	Black Galv.	Inches	Wrought Iron	Black Galv.
1/4	51 1/2	29 1/2	1/4	91 1/2	138
1/2	53 1/2	35	1/2	91 1/2	21 1/2
3/4	55 1/2	47	3/4	91 1/2	15
1	57 1/2	52	1	91 1/2	20 1/2
1 1/4	59 1/2	55	1 1/4	91 1/2	25 1/2
1 1/2	61 1/2	55	1 1/2	91 1/2	28
2	63 1/2	55	2	91 1/2	26

Lap Weld

2	60	51	2	37	22 1/2
2 1/2	63	54	2 1/2	38	25
3	65	56	3	40	28 1/2
3 1/2	67	58	3 1/2	42	31 1/2
4	69	60	4	44	34 1/2
4 1/2	71	62	4 1/2	46	37 1/2
5	73	64	5	48	40 1/2
5 1/2	75	66	5 1/2	50	43 1/2
6	77	68	6	52	46 1/2
6 1/2	79	70	6 1/2	54	49 1/2
7	81	72	7	56	52 1/2
7 1/2	83	74	7 1/2	58	55 1/2
8	85	76	8	60	58 1/2
8 1/2	87	78	8 1/2	62	61 1/2
9	89	80	9	64	64 1/2
9 1/2	91	82	9 1/2	66	67 1/2
10	93	84	10	68	70 1/2
10 1/2	95	86	10 1/2	70	73 1/2
11	97	88	11	72	76 1/2
11 1/2	99	90	11 1/2	74	79 1/2
12	101	92	12	76	82 1/2

Butt Weld, extra strong, plain ends

1/4	48 1/2	33 1/2	1/4	13	45 1/2
1/2	51 1/2	38	1/2	16	48 1/2
3/4	54 1/2	47 1/2	3/4	19	51 1/2
1	57 1/2	52	1	22	54 1/2
1 1/4	60 1/2	55	1 1/4	25	57 1/2

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2 1/2	61	53	2 1/2	42	29
3	63	56	3	44	32
3 1/2	65	59	3 1/2	46	35
4	67	62	4	48	38
4 1/2	69	64	4 1/2	50	41
5	71	66	5	52	44
5 1/2	73	68	5 1/2	54	47
6	75	70	6	56	50
6 1/2	77	72	6 1/2	58	53
7	79	74	7	60	56
7 1/2	81	76	7 1/2	62	59
8	83	78	8	64	62
8 1/2	85	80	8 1/2	66	65
9	87	82	9	68	68
9 1/2	89	84	9 1/2	70	71
10	91	86	10	72	74
10 1/2	93	88	10 1/2	74	77
11	95	90	11	76	80
11 1/2	97	92	11 1/2	78	83
12	99	94	12	80	86

On butt-weld steel pipe two extra 5% discounts are allowed on sales to consumers while three 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less.

Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$ 8.60	\$ 7.82
1 1/4 in. o.d. 13 B.W.G.	10.19	9.26
1 1/2 in. o.d. 13 B.W.G.	11.26	10.23
1 3/4 in. o.d. 13 B.W.G.	12.81	11.64
2 in. o.d. 13 B.W.G.	14.35	13.04
2 1/4 in. o.d. 13 B.W.G.	16.00	14.54
2 1/2 in. o.d. 12 B.W.G.	17.61	16.01
2 3/4 in. o.d. 12 B.W.G.	19.29	17.54
3 in. o.d. 12 B.W.G.	20.45	18.59
3 in. o.d. 12 B.W.G.	21.45	19.50
3 1/2 in. o.d. 10 B.W.G.	41.95	37.35
3 1/2 in. o.d. 11 B.W.G.	47.09	42.62
4 in. o.d. 10 B.W.G.	33.69	30.54
4 1/2 in. o.d. 10 B.W.G.	41.08	37.35
5 in. o.d. 9 B.W.G.	51.56	46.87
6 in. o.d. 7 B.W.G.	79.15	71.90

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Of List	
Machine and carriage bolts:	
1/2 in. x 8 in. and smaller.....	70, 10 and 5
Larger than 1/2 in.	70 and 10
Lag bolts.....	70 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70 and 10
Hot-pressed nuts, blank or tapped, square.....	70 and 10
Hot-pressed nuts, blank or tapped, hexagonal.....	70 and 10
C.p.e. and t. square or hex. nuts, blank or tapped.....	70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl. 1 in. diameter.....	60, 20 and 15
Larger than 1 in. diameter.....	60, 20 and 15
Stove bolts in packages, Pittsburgh.....	72 1/2 and 10
Stove bolts in packages, Cleveland.....	72 1/2 and 10
Stove bolts in bulk, Pittsburgh.....	82 1/2
Stove bolts in bulk, Cleveland.....	82 1/2
Stove bolts in bulk, Cleveland.....	82 1/2
Tire bolts.....	55

Large Rivets (1/2-in. and larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00
F.o.b. Birmingham.....	3.05

Small Rivets (7/16-in. and smaller)	
F.o.b. Pittsburgh.....	70 and 5
F.o.b. Cleveland.....	70 and 5
F.o.b. Chicago and Birm'g'm.....	70 and 5

Cap and Set Screws	
(Weight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)	
Milled cap screws, 1 in. dia. and smaller.....	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller.....	75
Milled headless set screws, cut thread 1/2 in. and smaller.....	75
Unset hex. head cap screws, U.S.S. or S.A.E., thread, 1 in. and smaller.....	85
Unset set screws, cut and oval points.....	75 and 10
Milled studs.....	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots	
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.....	
Unrefined.....	\$40 per gross ton
Alloy Steel Blooms, Billets and Slabs	
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.....	
Base price.....	\$19 a gross ton

Alloy Steel Bars	
Price del'd Detroit is \$52.	
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.....	
Open-hearth grade, base.....	2.45c.
Delivered price at Detroit is.....	2.60c.
S.A.E. Alloy	
Series.....	Differential
Numbers.....	per 100 lb.
2000 (1/2% Nickel).....	\$0.25
2100 (2 1/4% Nickel).....	0.55
2300 (3 1/4% Nickel).....	1.50
2500 (5% Nickel).....	2.25
3100 Nickel Chromium.....	0.55
3200 Nickel Chromium.....	1.35
3300 Nickel Chromium.....	3.80
3400 Nickel Chromium.....	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum (1.50 to 2.00 Nickel).....	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35
5100 Chromium Steel (0.60 to 1.10 Chromium).....	0.45
5100 Chromium Spring Steel.....	base
6100 Chromium Vanadium Bar.....	1.10c.
6100 Chromium Vanadium Spring Steel.....	0.70
Chromium Nickel Vanadium.....	1.40
Carbon Vanadium.....	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

STAINLESS STEEL No. 302 (17 to 19% Cr. 7 to 9% NI. 0.08 to 0.20% C.) (Base Prices F.o.b. Pittsburgh)	
Forging billets.....	Per Lb. 19.55c.
Bars.....	23c.
Plates.....	23c.
Structural shapes.....	23c.
Sheets.....	33c.
Hot-rolled strip.....	20 1/2c.
Cold-rolled strip.....	27c.
Drawn-wire.....	23c.

Raw and Semi-Finished Steel

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.....	
Per Gross Ton.....	\$29.00
Rolling quality.....	35.00

Delivered Detroit	
Rolling.....	\$32.00
Forging.....	38.00

Billets Only F.o.b. Duluth	
Rolling.....	\$31.00
Forging.....	37.00

Sheet Bars	
F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.....	
Open-hearth or Bessemer.....	\$30.60

Skep

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.....	
Per Lb.	1.80c.
Grooved.....	1.80c.
Universal.....	1.80c.
Sheared.....	1.80c.

Wire Rods (Common, base)

Per Gross Ton	
F.o.b. Pittsburgh.....	\$40.00
F.o.b. Cleveland.....	40.00
F.o.b. Chicago.....	41.00
F.o.b. Anderson, Ind.....	41.00
F.o.b. Youngstown.....	41.00
F.o.b. Worcester, Mass.....	42.00
F.o.b. Birmingham.....	43.00
F.o.b. San Francisco.....	49.00
F.o.b. Galveston.....	46.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.....	\$20.50	\$21.00	\$20.00	\$21.50
Bethlehem, Pa.....	20.50	21.00	20.00	21.50
Birdsboro, Pa.....	20.50	21.00	20.00	21.50
Swedeland, Pa.....	20.50	21.00	20.00	21.50
Steelton, Pa.....	20.50	21.00	20.00	21.50
Sparrows Point, Md.....	20.50	21.00	20.00	21.50
Neville Island, Pa.....	19.50	19.50	19.00	20.00
Sharpsville, Pa.....	19.50	19.50	19.00	20.00
Youngstown.....	19.50	19.50	19.00	20.00
Buffalo.....	19.50	20.00	18.50	20.50
Erie, Pa.....	19.50	20.00	19.00	20.00
Cleveland.....	19.50	19.50	19.00	20.00
Toledo, Ohio.....	19.50	19.50	19.00	20.00
Jackson, Ohio.....	21.25	21.25	20.75	21.25
Detroit.....	19.50	19.50	19.00	20.00
Hamilton, Ohio.....	19.50	19.50	19.00	20.00
Chicago.....	19.50	19.50	19.00	20.00
Granite City, Ill.....	19.50	19.50	19.00	20.00
Duluth, Minn.....	20.00	20.00	20.00	20.00
Birmingham.....	15.50	15.50	14.50	20.00
Provo, Utah.....	17.50	17.00	17.00	20.00

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.....	\$21.00	\$21.50	\$20.50	\$22.00
Brooklyn				
From East, Pa.....	22.9289	23.4289	21.4873	22.9873
Newark or Jersey City, N. J.	21.9873	22.4873	21.4873	22.9873
From East, Pa.....	21.3132	21.8132	20.8132	22.3132
Philadelphia				
From Eastern Pa.....	20.5807	20.5807	20.0807	21.0807
Canton, Ohio				
From Cleveland and Youngstown	20.8482	20.8482	20.3482	21.3482
Columbus, Ohio	21.64	21.64	20.8482	21.3482
From Hamilton, Ohio.....	21.3832	21.3832	20.8832	21.3832
Mansfield, Ohio				
From Cleveland and Toledo.....	21.3832	21.3832	20.8832	21.3832
Indianapolis				
From Hamilton, Ohio.....	21.9289	21.9289	20.9289	21.9289
South Bend, Ind.....	21.6935	21.6935	20.6935	21.6935
Milwaukee				
From Chicago.....	20.57	20.57	20.57	20.57
St. Paul				
From Duluth.....	21.94	21.94	21.94	21.94
Davenport, Iowa				
From Chicago.....	21.3832	21.3832	20.3832	21.3832
Kansas City				
From Granite City.....	22.2178	22.2178	21.2178	22.2178
San Francisco, Los Angeles or Seattle. From Provo.....	22.315	22.315	21.315	22.315

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....	\$24.00
---	---------

GRAY FORGE PIG IRON

Valley furnace.....	\$19.00
Pittsburgh district furnace.....	19.00

CHARCOAL PIG IRON

Lake Superior furnace.....	\$22.00
Delivered Chicago.....	25.2528
Delivered Buffalo.....	25.595

CANADA

Pig Iron

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$21.00
No. 2 fdy., sil. 1.75 to 2.75.....	20.50
Malleable.....	22.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.50
No. 2 fdy., sil. 1.75 to 2.25.....	22.00
Malleable.....	22.50
Basic.....	22.50

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.....	
Domestic, 80% (carload).....	Per Gross Ton \$75.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%.....	\$26.00
50-ton lots 3-m. shipment.....	24.00
F.o.b. New Orleans.....	26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads).....	\$75.00
50% (ton lots).....	85.00
75% (carloads).....	125.00
75% (ton lots).....	135.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	
6.00 to 6.50.....	\$22.75
6.51 to 7.00.....	23.25
7.01 to 7.50.....	23.75
7.51 to 8.00.....	24.25
8.01 to 8.50.....	24.75
8.51 to 9.00.....	25.25
9.01 to 9.50.....	25.75
9.51 to 10.00.....	26.25
10.01 to 10.50.....	26.75
10.51 to 11.00.....	27.25
11.01 to 11.50.....	27.75
11.51 to 12.00.....	28.25

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson. Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton	
10.00 to 10.50.....	\$27.75
10.51 to 11.00.....	28.15
11.01 to 11.50.....	28.75
11.51 to 12.00.....	29.25
12.....	30.25

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carloads.....	\$1.30
Ferrotungsten, lots of 5000 lb.....	1.35
Ferrotungsten, smaller lots.....	1.40
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in car loads.....	10.00c.
Ferrocromium, 2% carbon.....	16.50c. to 17.00c.
Ferrocromium, 1% carbon.....	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon.....	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon.....	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.....	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.....	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton.....	\$137.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace carload and contract, per net ton.....	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18% with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton.....	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.....	75.00
Ferromolybdenum, per lb. Mo. del.	95c.
Calcium molybdate, per lb. Mo. del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads.....	\$38.00
Ton lots or less, per ton.....	45.50
Silico-manganese, gross ton, delivered.....	
2.50% carbon grade.....	85.00
2% carbon grade.....	90.00
1% carbon grade.....	100.00
Spot prices.....	\$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	\$14.50 to \$15.00
No. 2 heavy melting steel	13.25 to 13.75
No. 3 railroad wrought	14.50 to 15.00
Scrap rails	15.00 to 15.50
Rails, 3 ft. and under	15.50 to 16.00
Compressed sheet steel	14.50 to 15.00
Hand bundled sheet steel	13.25 to 13.75
Hvy. steel axle turnings	13.00 to 13.50
Machine shop turnings	10.25 to 10.75
Short shov. turnings	10.25 to 10.75
Short mixed borings and turnings	8.50 to 9.50
Cast iron borings	8.50 to 9.50
Cast iron car wheels	14.00 to 14.50
Heavy breakable cast	12.50 to 13.00
No. 1 cast	14.00 to 14.50
Half knuckles and couplers	17.00 to 17.50
Rail, coil and leaf springs	17.00 to 17.50
Bolled steel wheels	17.00 to 17.50
Low phos. billet crops	17.25 to 17.75
Low phos. sheet bar crops	17.00 to 17.50
Low phos. punchings	16.50 to 17.00
Low phos. plate scrap	15.75 to 16.25
Steel car axles	15.50 to 16.00

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton	
Heavy melting steel	\$14.25 to \$14.75
Automobile hvy. melt steel	12.25 to 12.75
Swirling steel	14.25 to 14.75
Hydraulic comp. sheets	13.50 to 14.00
Drop forge flashings	10.75 to 11.25
No. 1 busheling	13.00 to 13.50
Rolled car wheels	15.50 to 16.00
Railroad tires	15.50 to 16.00
Railroad leaf springs	13.00 to 13.50
Idle turnings	13.00 to 13.50
Steel couplers and knuckles	15.00 to 15.50
Coil springs	16.00 to 16.50
Idle turnings (elec. fur.)	13.50 to 14.00
Low phos. punchings	16.00 to 16.50
Low phos. plates, 12 in. and under	16.00 to 16.50
Cast iron borings	6.50 to 7.00
Machine shop turnings	8.25 to 8.75
Berolling rails	15.50 to 16.00
Steel rails, less than 3 ft.	15.50 to 16.00
Steel rails, less than 2 ft.	16.50 to 17.00
Ankle bars, steel	15.50 to 16.00
Cast iron car wheels	14.00 to 14.50
Railroad malleable	17.50 to 18.00
Agricultural malleable	14.50 to 15.00

Per Net Ton

Iron car axles	\$18.50 to \$19.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	13.25 to 13.75
No. 2 railroad wrought	12.75 to 13.25
No. 3 busheling, old	7.00 to 7.50
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	7.00 to 7.50
No. 1 machinery cast	13.00 to 13.50
Clean automobile cast	12.00 to 12.50
No. 1 railroad cast	12.00 to 12.50
No. 1 agricultural cast	10.25 to 10.75
Store plate	7.50 to 8.00
Grate bars	8.75 to 9.25
Brake shoes	9.00 to 9.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	\$13.50 to \$14.00
No. 2 heavy melting steel	12.00 to 12.50
Hydraulic compressed, new	12.00 to 12.50
Hydraulic compressed, old	9.50 to 10.00
Steel rails for rolling	14.50 to 15.00
Cast iron car wheels	14.50 to 15.00
Heavy breakable cast	13.00 to 13.50
No. 1 cast	13.00 to 13.50
Store plate (steel works)	10.50 to 11.00
Railroad malleable	16.50 to 17.00
Machine shop turnings	8.00 to 8.50
No. 1 blast furnace	6.25 to 6.75
Cast borings	6.00 to 6.50
Heavy axle turnings	10.25 to 10.75
No. 1 low phos. heavy	16.00 to 16.50
Couplers and knuckles	16.00 to 16.50
Bolled steel wheels	16.00 to 16.50
Steel axles	16.50 to 17.00
Shafting	18.25 to 18.75
No. 1 railroad wrought	13.00 to 13.50
Spec. iron and steel pipe	10.50 to 11.00
Bundled sheets	11.00 to 11.50
No. 1 forge fire	12.00 to 12.50
Cast borings (chem.)	10.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	\$11.50 to \$12.00
No. 2 heavy melting steel	9.50 to 10.00
Scrap rails for melting	11.00 to 11.50
Loose sheet clippings	7.50 to 8.00
Bundled sheets	8.50 to 9.00
Cast iron borings	6.50 to 7.00
Machine shop turnings	7.25 to 7.75
No. 1 busheling	9.00 to 9.50
No. 2 busheling	4.75 to 5.25
Rails for rolling	11.50 to 12.00
No. 1 locomotive tires	10.50 to 11.00
Short rails	14.50 to 15.00
Cast iron car wheels	11.00 to 11.50
No. 1 machinery cast	12.00 to 12.50
No. 1 railroad cast	11.25 to 11.75
Burnt cast	8.25 to 8.75
Store plate	8.25 to 8.75
Agricultural malleable	10.25 to 10.75
Railroad malleable	12.00 to 12.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	\$14.50 to \$15.00
No. 2 heavy melting steel	13.50 to 14.00
Compressed sheet steel	14.00 to 14.50
Light bundled sheet stampings	11.00 to 11.50
Drop forge flashings	13.50 to 14.00
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	8.75 to 9.00
No. 1 busheling	13.50 to 14.00
Steel axle turnings	12.50 to 13.00
Low phos. billet crops	17.50 to 18.00
Cast iron borings	8.75 to 9.00
Mixed borings and short turnings	8.75 to 9.00
No. 2 busheling	8.75 to 9.00
No. 1 cast	15.00 to 15.50
Railroad grate bars	8.00 to 8.50
Store plate	9.00 to 9.50
Rails under 3 ft.	17.50 to 18.00
Rails for rolling	15.50 to 16.00
Railroad malleable	16.50 to 17.00
Cast iron car wheels	15.00 to 15.50

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	\$12.25 to \$12.75
No. 2 heavy melting scrap	11.25 to 11.75
Scrap rails	12.25 to 12.75
New hydraulic comp. sheets	10.25 to 10.75
Old hydraulic comp. sheets	9.50 to 10.00
Drop forge flashings	11.25 to 11.75
No. 1 busheling	11.25 to 11.75
Hvy. steel axle turnings	11.25 to 11.75
Machine shop turnings	6.50 to 7.00
Knuckles and couplers	13.50 to 14.00
Coil and leaf springs	13.50 to 14.00
Rolled steel wheels	13.50 to 14.00
Low phos. billet crops	14.50 to 15.00
Short shov. steel turnings	8.25 to 8.75
Short mixed borings and turnings	8.25 to 8.75
Cast iron borings	8.25 to 8.75
No. 2 busheling	6.00 to 6.50
Steel car axles	12.50 to 13.00
Iron axles	12.50 to 13.00
No. 1 machinery cast	11.25 to 11.75
No. 1 cupola cast	11.50 to 12.00
Store plate	10.00 to 10.50
Steel rails, 3 ft. and under	14.50 to 15.00
Cast iron car wheels	12.00 to 12.50
Railroad malleable	16.25 to 16.75
Chemical borings	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	\$10.50
*No. 1 heavy melting steel	9.75
*Scrap rails	10.50
Scrap rails	\$8.25 to \$8.80
No. 2 steel	8.50
Breakable cast	8.00 to 8.25
*Machine shop turnings	5.50 to 5.75
Machine shop turnings	4.25 to 4.50
Bundled skeleton, long	7.25 to 7.65
Shafting	13.00 to 13.25
Engine, stripped	8.00 to 8.50
Cast iron borings, chemical	5.00 to 5.50
Cotton ties	6.00
*Store plate	7.00

Per gross ton delivered consumers' yards:

Textile cast	\$10.00 to \$10.25
No. 1 machinery cast	10.00 to 10.50
Store plate	6.50 to 7.00

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	\$9.25 to \$10.00
No. 2 heavy melting steel	8.25 to 8.75
Heavy breakable cast	8.00 to 8.25
No. 1 machinery cast	9.00 to 9.50
No. 2 cast	7.75 to 8.00
Store plate	7.00 to 7.50
Steel car axles	13.50 to 14.00
Shafting	13.50 to 13.75
No. 1 railroad wrought	8.50 to 9.00
No. 1 yard wrought long	7.50 to 8.00
Spec. iron and steel pipe	6.00 to 6.50
Forge fire	6.50 to 7.00
Rails for rolling	11.00 to 12.00
Short shoveling turnings	4.00 to 4.50
Machine shop turnings	4.00 to 4.50
Cast borings	3.00 to 3.50
No. 1 blast furnace	3.00 to 3.50
Cast borings (chemical)	10.00 to 11.00
Unprepared yard iron and steel	4.50 to 5.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	\$11.50
No. 1 hvy. cast (cupola size)	9.50
No. 2 cast	8.00

† Loading on barge.

*50c. higher offered at nearby New Jersey points.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	\$9.50 to \$10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.00 to 7.50
Store plates	7.00 to 7.50
Steel axles	11.50 to 12.00
Iron axles	11.50 to 12.00
No. 1 railroad wrought	8.50 to 9.00
Rails for rolling	12.50 to 13.00
No. 1 crst	10.50 to 11.00
Tramcar wheels	10.00 to 10.50

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:

Selected heavy steel	\$12.50 to \$13.00
No. 1 heavy melting	12.50 to 13.00
No. 2 heavy melting	11.00 to 11.50
No. 1 locomotive tires	11.00 to 11.50
Misc. stand-sec. rails	13.00 to 13.50
Railroad springs	12.00 to 12.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	12.50 to 13.00
No. 1 busheling	7.50 to 8.00
Cast iron borings and shoveling turnings	4.50 to 5.00
Rails for rolling	13.75 to 14.25
Machine shop turnings	4.00 to 4.50
Heavy turnings	9.25 to 9.75
Steel car axles	13.00 to 13.50
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	10.50 to 11.00
Steel rails less than 3 ft.	13.50 to 14.00
Steel angle bars	13.00 to 13.50
Cast iron car wheels	11.00 to 11.50
No. 1 machinery cast	11.25 to 11.75
Railroad malleable	14.25 to 14.75
No. 1 railroad cast	11.25 to 11.75
Store plate	7.50 to 8.00
Agricult. malleable	12.50 to 13.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	\$11.00 to \$11.50
---------------------------	--------------------

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50% iron	\$4.80
Mesabi, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.I.F. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% iron dry Spanish or Algeria	10.25c.
Iron, low phos., Swedish, average 68% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	25c.
Manganese, African, Indian, 49-51%	26c.
Manganese, Brazilian, 46 to 48%	24c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered	\$16.00
Tungsten, domestic, scheelite delivered	16.00

Per Gross Ton

Chrome, 45% Cr ₂ O ₃ , lamp, c.i.f.	
Atlantic Seaboard (African) 45 to 46% Cr ₂ O ₃ (Turkish)	\$17.50
48% Cr ₂ O ₃ (African)	20.50
48% min. Cr ₂ O ₃ (Turkish)	19.25
Chrome concentrate, 50% and over Cr ₂ O ₃ , c.i.f. Atlantic Seaboard	22.00
52% Cr ₂ O ₃ (Turkish)	21.75
48 to 49% Cr ₂ O ₃ (Turkish)	19.25

Fluorspar

Per Net Ton

Domestic, washed gravel, .85-5, f.o.b. Kentucky and Illinois mines for all rail shipment	\$17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	20.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville	
Prompt	\$3.65 to \$3.80
Foundry, f.o.b. Connellsville	
Prompt	4.25 to 5.75
Foundry, by-product, Chicago ovens, for delivery outside switching district	9.00
Foundry, by-product, delivery in Chicago switching district	9.75
Foundry, by-product, New England, delivered	11.50
Foundry, by-product, Newark or Jersey City, del'd	9.65
Foundry, by-product, Phila. land, delivered	9.75
Foundry, by-product, Cincinnati, del'd	9.50

No. 2 heavy melting steel, \$10.25 to \$10.75

Borings and turnings	6.50 to 7.00
Long turnings	6.50 to 7.00
No. 1 machinery cast	14.00 to 14.50
Automotive cast	14.00 to 14.50
Hydraulic comp. sheets	11.50 to 12.00
Store plate	8.75 to 9.25
New factory busheling	10.00 to 10.50
Old No. 2 busheling	6.00 to 6.50
Sheet clippings	8.50 to 9.00
Flashings	10.25 to 10.75
Low phos. plate scrap	11.25 to 11.75

CANADA

Dealers' buying prices per gross ton:

Toronto Montreal	
Heavy melting steel	\$7.50 \$7.00
Rails, scrap	8.50 8.00
Machine shop turnings	4.00 4.00
Boiler plate	7.00 6.00
Heavy axle turnings	4.50 4.00
Cast borings	5.00 4.50
Steel borings	4.00 4.00
Wrought pipe	4.00 4.00
Steel axles	8.50 9.00
Axles, wrought iron	9.00 9.50
No. 1 machinery cast	11.50 11.00
Store plate	7.50 7.00
Standard car wheels	11.00 10.50
Malleable	7.00 7.00
Shoveling steel	6.50 6.00
Bushings	6.00 5.50
Compressed sheets	6.50 6.00

Foundry, Birmingham

Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.90 to 2.10
Gas coal, 1/2-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.25c.
No. 4 industrial	3.87 1/2c.

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.25c.
No. 4 industrial	3.87 1/2c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	5.00c.
---------------------------	--------

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.95c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.35c.
Squares and flats	3.35c.
Hoops and bands under 1/4 in.	3.20c.
Hot-rolled annealed sheets (No. 24)	3.30c.
25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count	65 per cent off list.
Machine bolts, 100 count	65 per cent off list.
Carriage bolts, 100 count	65 per cent off list.
Nuts, all styles, 100 count	65 per cent off list.
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'd, base per 100 lb.	\$2.70
Wire, galv. soft, base per 100 lb.	\$2.925
Common wire nails, per keg	\$2.834
Cement coated nails, per keg	\$2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lbs.
*Delivered in Pittsburgh switching district.

Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

Tank rivets, 7/16 in. and smaller... 55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:
All quantities... 70
*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
*Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.76c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
*Hot-rolled anneal. sheets (No. 24)	3.35c.
*Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, 1/4 in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.
‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
*Cold-finished steel bars	3.50c.
*Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	\$3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'd wire, per 100 lb.	\$2.45
*No. 9 galv. wire, per 100 lb.	2.80
*Com. wire nails, base per keg	2.40

†Outside delivery 10c. less.
*For 5000 lb. or less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.42c.
Bars, rounds, flats and angles	3.22c.
Other shapes	3.37c.
Rail steel reforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars	3.72c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain, lin. per 100 lb.	8.35
Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.38c.
Struc. shapes	3.25c.
Soft steel bars	3.05c.
Reinforcing bars	2.60c.

Cold-fin. flats and sq.	3.55c.
Rounds and hex.	3.50c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets (3/16 in. 24 to 48 in. wide)	3.63c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg	\$3.35
Black wire, base per 100 lb. (2500-lb. lots or under)	3.55
(Over 2500 lb.)	3.45

BOSTON

	Base per Lb.
Beams, channels, angles, tees, zees	3.54c.
H beams and shapes	3.54c.
Plates—Sheered, tank and univ. mill.	3.56c.
1/4 in. thick and heavier	3.56c.
Floor plates, diamond pattern	3.56c.
Bar and bar shapes (mild steel)	3.45c.
Bands 3/16 in. thick and	3.45c.
No. 12 ga. incl.	3.65c.
Half rounds, half ovals, ovals and bevels	4.70c.
Tire steel	4.70c.
Cold-rolled strip steel	3.245c.
Cold-finished bars, squares and hexagons	3.90c.
Cold-finished flats	3.90c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga.	5.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.09c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.
Galvanized sheets (No. 24)**	4.72c.
Bands	3.39c.
Hoops	3.39c.
*Cold-finished bars	3.93c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts, in cases	70 and 10 per cent off list
Broken cases	70 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.
*Price applies to 1,000 lb. and over.
**With reduction in chemical extras.
*0.25c. off list for 10 to 25 bundles; 0.50c. for 25 bundles and over. Detroit delivery only.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.31c.
Soft steel bars, rounds up to 8 in.	3.11c.
Flats and fillet angles	3.11c.
Soft steel bars, squares and hexagons	3.29c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 20)	4.66c.
Cold-finished steel bars	3.61c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	3.86c.
Boiler rivets, cone head (keg lots)	3.96c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
Black annealed wire	3.15c.
Com. wire nails	2.85c.
Cement coated nails	2.85c.
Machine bolts	70 and 10
Carriage bolts	70 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70 and 10

Prices given above are delivered Milwaukee.
On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.25c.
Structural shapes	3.45c.
Plates	3.45c.
Cold-finished bars	4.02c.
Bands and hoops	3.50c.
Hot-rolled annealed sheets, No. 24	3.90c.
Galvanized sheets, No. 24	4.50c.
Cold-rolled sheets, No. 20	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
*Mild steel bars	3.00c.

**Reinforcing bars	2.85c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10	3.10c.
†Hot-rolled annealed sheets, No. 24	3.60c.
†Galvanized sheets, No. 24	4.30c.
*Bands	3.45c.
*Hoops	3.45c.
§Cold-rolled rounds	3.58c.
§Cold-rolled squares, hex. and flats	3.58c.
Rivets	4.40c.
Bolts and nuts, per cent off list	.60 and 10

*Quantity extras per size apply. †Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over, base: 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb., add 30c.; 0 to 999 lb., add 50c.
‡25 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 24 bundles add 25c.
§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add \$1.00; for 0 to 299 lb. add \$1.75; for combined order under 100 lb. add \$3.00.
**For orders 4000 lb. to 9999 lb. Add 15c. per 100 lb. for orders 2000 to 3999 lb.; add 65c. for orders less than 2000 lb.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.30c.
Iron bars	3.30c.
Reinforcing bars	3.30c.
Structural shapes	3.50c.
Plates	3.50c.
Hot-rolled sheets, No. 10	3.30c.
Hot-rolled annealed sheets, No. 24	4.16c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.61c.
Cold-finished bars	3.98c.

MEMPHIS

	Base per Lb.
Mild steel bars	3.47c.
Shapes, bar size	3.47c.
Iron bars	3.47c.
Structural shapes	3.67c.
Plates	3.67c.
Hot-rolled sheets, No. 10	3.47c.
Hot-rolled annealed sheets, No. 24	4.57c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.72c.
Cold-drawn rounds	3.89c.
Cold-drawn flats, squares, hexagons	5.89c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.35c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.50c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c.
Cold-finished steel bars	4.50c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$2.95
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb.
San Fran- Los An- Geo Seattle	
Plates, tank and	3.25c. 3.60c. 3.55c.
U. M.	3.25c. 3.60c. 3.55c.
Shapes, standard	3.25c. 3.60c. 3.55c.
Soft steel bars	3.25c. 3.60c. 3.70c.
Reinforcing bars	
f.o.b. cars dock	2.45c. 2.45c. 2.45c.
Pacific ports	
Hot-rolled annealed sheets (No. 24)	4.00c. 4.35c. 4.40c.
Hot-rolled sheets (No. 10)	3.35c. 3.70c. 3.75c.
Galv. sheets (No. 24)	4.50c. 4.95c. 5.00c.
Cold finished steel	
Rounds	5.80c. 5.85c. 6.00c.
Squares and hexagons	7.05c. 7.10c. 7.25c.
Flats	7.55c. 7.60c. 8.25c.
Common wire nails	
—base per keg	\$3.20. \$3.20. \$3.20
less carload	

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

	Base per Lb.
High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	11c.
Regular	14c.

Miscellaneous Buying Aids Market at Cleveland



Steel Production Up Two Points to 66 Per Cent of Capacity Despite Failure of Automotive Buying to Improve

CLEVELAND, Feb. 18.—Miscellaneous demand for steel is holding up well and some of the leading producers have entered as much tonnage so far this month as during the corresponding period of January. Ingot output in the Cleveland-Lorain district increased two points to 66 per cent of capacity this week, the Republic Steel Corp. having put on an additional local open-hearth furnace.

Orders for the motor car industry continue light. Business in sheets outside of the automotive field is still good. Activity in the construction field is being restricted by the extremely cold weather. Business from railroads is limited to small orders for repair work. The Erie Railroad is expected to have its inquiry for 800 cars out shortly.

With the time for naming prices for the second quarter close at hand, the price situation has become more unsettled and is aggravated by various unconfirmed rumors. Weakness in nails in other areas has spread to this district and covers not only nails but other wire products on which concessions of \$6 a ton are being made. The \$3 a ton concession on hot- and cold-rolled sheets has become more general. Weakness has developed on galvanized sheets on which shaded prices are being named to jobbers and to large consumers.

It seems quite doubtful whether the new prices on semi-finished steel will become effective at least before the second quarter. Most buyers are covered for their requirements to April 1 at the old prices so that no immediate test of the advance is expected. However, forging billets are firm.

Scarcity of steel making scrap due to the cold weather has resulted in another sharp advance on steel making grades in the Cleveland and Youngstown districts. Pig iron producers expect to reestablish present prices for the second quarter.

Pig Iron

While new business is not lively, sales and shipments so far this month held to the January volume.

Demand continues good from manufacturers of heating furnaces and sanitary ware and from stove foundries. Business from automobile foundries continues light. Low-priced iron in both Northern and Southern grades that was carried over from last year is still being shipped, but these old contracts are now about wiped out. Furnaces will open their books for the first quarter on March 1 and no change from the present \$19.50 price on foundry and malleable iron is looked for.

Bars, Plates and Shapes

Bars continue in fairly active demand from miscellaneous sources. Orders from the automotive industry continue very light. There is a good demand for small angles and other sections used by makers of stoves, refrigerators and washing machines. Demand for structural shapes from fabricators has slowed down reflecting the recent falling off in awards. Columbia Chemical Co., Barberton, Ohio, has

taken bids on tanks requiring 210 tons of plates. Reinforcing bars are inactive. Cold weather is checking new public work and shipment of bars against recent orders is being held up.

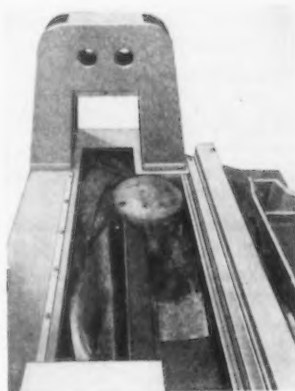
Sheets

Miscellaneous demand continues good. The slackening in orders from the motor car manufacturers still is in evidence. While some new specifications are coming from that source they are for comparatively small lots. Stamping plants in this territory making automobile parts continue to order in reduced volume. Black sheets are in good demand from barrel, stove and refrigerator manufacturers and other consumers. Enameling sheets are also moving well. Concessions of \$3 a ton on black and cold-rolled sheets to consumers outside of the automotive field have become more common. Some of the barrel manufacturers have been able to buy at the reduced prices. Galvanized sheets are not firm, the weakness that recently developed in other areas having extended to some extent to this district.

Strip Steel

Demand is slow. Automobile parts makers continue to take hot- and cold-rolled strip against old orders but in reduced volume, as they are operating on reduced production schedules. Some have contracts covering March requirements. Price irregularities prevail similar to those on sheets.

TRIPLE COMPRESSION SCRAP BALERS



STYLE
100 TC
(100 x 51 x 36)
and other sizes

Also Regular
**Double
Ram Presses**
in all sizes



GALLAND-HENNING
MANUFACTURING COMPANY

2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

Bolts and Nuts

Specifications from the motor car industry, which have been light recently, show a slight gain. Agricultural implement manufacturers continue to order freely. The volume of business so far this month shows a slight gain over the corresponding period in January. Recent car orders will require a good tonnage, but this is not expected to be placed for several weeks. Prices are reported to be somewhat firmer.

Scrap

Steel-making grades have further advanced \$1 a ton in Cleveland and 50c. a ton in the Valley district. A Cleveland mill purchased a fair tonnage of heavy melting steel and compressed sheet steel late in the week. With the consumer price for No. 1 heavy melting steel locally now above the \$15 level, brokers are paying \$14.50 to \$15 for that grade to cover their new orders. No. 1 steel is reported to have brought \$16 in Youngstown. Cold weather is still restricting the gathering and shipment of scrap and dealers' stocks are low. Mills are limiting purchases to early requirements, as they expect an easier market when the weather moderates and when the opening of navigation permits water shipments.

Steel Industry Backs Cleveland Exposition

THAT the steel and iron industry and manufacturers of heavy machinery will play an important part in the Great Lakes Exposition, to be held on the Cleveland lakefront June 27 to Oct. 4, is indicated in the support given the exposition's \$1,000,000 underwriting.

Among the underwriters of \$10,000 or more; Republic Steel Corp., \$30,000; United States Steel Corp., \$30,000; Standard Tool Co., \$25,000; Cleveland Twist Drill Co., \$25,000; M. Hanna Co., \$20,000; Cleveland-Cliffs Iron Co., \$15,000; Youngstown Sheet & Tube Co., \$15,000; Cleveland Graphite Bronze Co., \$15,000; Mather Iron Co., \$10,000; W. S. Tyler Co., \$10,000; Thompson Products Co., \$10,000; Interlake Iron Corp., \$10,000; Otis Elevator Co., \$10,000; and Perry-Payne Co., \$10,000.

The Great Lakes Exposition is to be staged on 125 acres of downtown Cleveland lakefront. It is attracting exhibits from manufacturers and business concerns throughout the entire Great Lakes region. The 100-day exposition will celebrate the centennial year of Cleveland.

Fabricated Structural Steel

Lettings in Good Volume—New Projects Lower

AWARDS of 33,215 tons are the largest since the third week in March, 1935, and compare with 19,650 tons last week. Outstanding bookings are 6325 tons for tunnel bracing at Fort Peck, Mont.; 3500 tons for the Federal Reserve Bank building, Washington; 3350 tons for the Torrence Avenue bridge in Chicago, and 3125 tons for a building at Varick and Hudson Streets, New York. New projects total 13,600 tons as against 25,350 tons in the previous week and 11,350 tons two weeks ago. The largest new jobs reported include 2200 tons for the Lever Brothers Co. at Hammond, Ind.; 2000 tons for a rod mill at Joliet, Ill., for the American Steel & Wire Co., and 1625 tons for an intercity viaduct at Kansas City, Mo. Plate awards call for 1945 tons. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Medford, Mass., 120 tons, municipal garage, to New England Structural Co.

Springfield, Mass., 100 tons, bridge, to Bethlehem Steel Corp.

Orange County, N. Y., 190 tons, highway bridge, to Bethlehem Steel Corp.

New York, 3125 tons, building at Hudson and Varick streets, to Post & McCord.

New York, 610 tons, Dry Dock Savings Institute, to Ingalls Iron Works Co.

New York, 245 tons, girders for Midtown tunnel ventilation building, to Lehigh Structural Steel Co.

New York, 155 tons, building alteration, 62 West 133rd Street, for Procurement Division, Treasury Department, to Eggleston Brothers & Co.

Buffalo, 615 tons, factory addition for Trico Products Corp., to Bethlehem Steel Corp.

Penn Township, Pa., 200 tons, school, to Ingalls Iron Works Co.

West Chester, Pa., 115 tons, addition to high school, to Bethlehem Steel Corp.

Washington, 3500 tons, Federal Reserve Bank building, to Bethlehem Steel Corp.

Delaware, Lackawanna & Western Railroad, 160 tons, three bridges, to American Bridge Co.

SOUTH AND SOUTHWEST

Sharkey County, Miss., 305 tons, bridge, to Vincennes Bridge Co.

Oklahoma City, Okla., 675 tons, overhead crossing, to J. B. Klein Iron & Foundry Co.

Rotan, Tex., 100 tons, rock mill building and bins for National Gypsum Co., to Buffalo Structural Steel Corp.

CENTRAL STATES

Hamtramck, Mich., 515 tons, State highway bridge, to Jones & Laughlin Steel Corp.

Saginaw, Mich., 330 tons, State highway bridge, to R. C. Mahon Co.

Columbus, Ohio, 240 tons, dairy building, to C. E. Morris Co.

Zanesville, Ohio, 115 tons, building alteration, to Wise Foundry, Machine & Supply Co.

Cincinnati, 510 tons, water purification plant, to Bethlehem Steel Corp.

Chicago, 3350 tons, Torrence Avenue bridge, to American Bridge Co.

Chicago, 1200 tons, Stony Island bridge, to Bethlehem Steel Corp.

French Village, Ill., 600 tons, State highway bridge, to St. Louis Structural Steel Co.

St. Paul, Minn., 310 tons, transmission towers for Northern States Power Co., to American Bridge Co.

Macoupin County, Ill., 235 tons, highway bridge, to R. C. Mahon Co.

Perry County, Ill., 140 tons, highway bridge, to Worden-Allen Co.

La Crosse, Wis., 717 tons, Medary overhead, to Worden-Allen Co.

Milwaukee, 675 tons, Rawson-Howell overhead, to Worden-Allen Co.

Franklin, Neb., 115 tons, bridge, to Lincoln Steel Works.

Johnson County, Kan., 145 tons, school auditorium, to Kansas City Structural Steel Co.

WESTERN STATES

Fort Peck, Mont., 6325 tons, tunnel ring bracing, to American Bridge Co.

Climax, Colo., 130 tons, Climax Molybdenum Co. mill, to Midwest Steel & Iron Co.

Blackfoot, Idaho, 450 tons, State highway bridge, to Virginia Bridge Co.

Big Horn County, Wyo., 115 tons, bridge, to American Bridge Co.

Fremont County, Wyo., 448 tons, seven State bridges on Dubois-Riverton highway, to Midwest Steel Co.

Los Angeles, 3000 tons, Metropolitan water district, to Consolidated Steel Corp.

Norwalk, Cal., 400 tons, Excelsior Union high school, to Pacific Iron & Steel Co.

Whittier, Cal., 145 tons, school, to Kyle Steel Construction Co.

Palo Alto, Cal., 700 tons, auditorium at Stanford University, to Judson-Pacific Co.

Oakland, Cal., 114 tons, State undercrossing at Broadway Terrace, to Bethlehem Steel Corp.

Seattle, 300 tons, State bridge, to Wallace Bridge & Structural Steel Co.

Pierce County, Wash., 300 tons, State undercrossing, to Poole & McGonigle.

Tacoma, Wash., 400 tons, theater, to Minneapolis-Moline Power Implement Co.

Grant County, Ore., 280 tons, State bridge, to Virginia Bridge Co.

Salem, Ore., 570 tons, State highway bridge, to Poole & McGonigle.

Pasadena, Cal., 100 tons, high school, to Western Iron & Metal Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Bangor, Me., 200 tons, two hospital units.

Burlington-Colechester, Vt., 350 tons, Malletts Bay Road bridge.

Boston, 300 tons, Navy Yard No. 1 pier repairs.

Pittsfield, Mass., 100 tons, two bridges.

State of New York, 720 tons, six highway bridges.

Syracuse, N. Y., 470 tons, New York Central Railroad express building.

Rome, N. Y., 100 tons, Ross & Reid, Washington, low bidders.

Jamestown, N. Y., 600 tons, grade crossing and State highway bridge; L. C. Whitford, Wellsville, low bidder.

Chemung County, N. Y., 300 tons, grade crossing and State highway bridge; Metzger Construction Co., Buffalo, low bidder.

Monroe County, N. Y., 200 tons, grade crossing and State highway bridge, Dolomite Products Corp., Rochester, N. Y., low bidder.

Delaware County, Pa., 550 tons, grade elimination; bids March 6.

Washington, 510 tons, Department of Agriculture look-out towers.

SOUTH AND SOUTHWEST

Jacksonville, Fla., 800 tons, Florida Relief Administration bridge repair material.

Yuma, Ariz., 245 tons, tunnel supports on Gila Valley project; bids Feb. 27.

CENTRAL STATES

Hammond, Ind., 2200 tons, for Lever Brothers Co.

Joliet, Ill., 2000 tons, rod mill for American Steel & Wire Co.

State of Iowa, 1425 tons, bridges.

Kansas City, Mo., 1645 tons, inter-city viaduct; bids to be asked separately Feb. 22 by Kansas and Missouri State Highway Commissions.

WESTERN STATES

Los Angeles, 186 tons, additional for Eagle pumping plant on Colorado River aqueduct; bids March 13.

San Mateo, Cal., 1300 tons, State livestock building; new bids March 10.

Los Angeles, 140 tons, telescoping forms for Metropolitan Water District, Specification No. 144, Lakeside Bridge & Steel Co. low bidder.

Long Beach, Cal., 250 tons, Veterans Memorial hospital; bids opened.

Santa Monica, Cal., 700 tons, addition to Douglas Aircraft Co. plant; bids soon.

Lorenzo, Idaho, 600 tons, State bridge over Snake River; general contract awarded.

FABRICATED PLATES

AWARDS

New York, 415 tons, two barges for Pan American Petroleum & Transport Co., to Nashville Bridge Co.

Vicksburg, Pa., 110 tons, derrick barge for United States engineers, to Treadwell Construction Co.

Hammond, Ind., 1100 tons, tanks for Lever Brothers Co., to Hamler Boiler & Tank Co.

Alhambra, Cal., 320 tons, two city tanks, to Chicago Bridge & Iron Works.

NEW PROJECTS

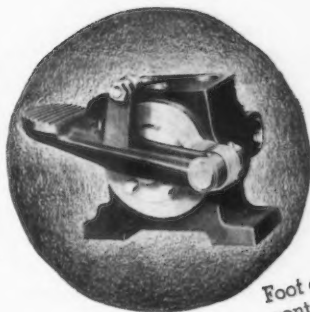
Barberton, Ohio, 210 tons, tanks for Columbia Chemical Co.

SHEET PILING

NEW PROJECTS

Galveston, Tex., 1900 tons, groins; contractors' bids Feb. 21 by United States Engineer Office.

Sausalito, Cal., 360 tons sheet piling, yacht harbor; second bids rejected.



STEP ON IT . . . !

Foot operated valves speed up production and simplify control. The operator's hands are free for other work. Use Hannifin "Packless" Air Control Valves with their simple, dependable disc type construction and get full value out of air power. There is no packing—and no leakage or maintenance trouble.

Made in 3-way and 4-way types, treadle operated, spring return and heavy duty rotary models, for various standard control cycles. Also hand control valves, manifold types, electric valves, and special types, for control of all kinds of air and hydraulic equipment. Write for Valve Bulletin No. 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 SOUTH KOLMAR AVENUE CHICAGO, ILLINOIS
ENGINEERS • DESIGNERS
MANUFACTURERS
Pneumatic and Hydraulic
Production Tool Equipment

HANNIFIN "Packless" AIR CONTROL VALVES

Fiftieth Anniversary of Aluminum Production Is Observed by Electrochemical Society

THE fiftieth anniversary of the discovery by the late Charles Martin Hall of the electrolytic process for the manufacture of aluminum was celebrated at a banquet held by the Electrochemical Society at the Waldorf-Astoria Hotel, New York, Feb. 17. The occasion also marked the twenty-fifth anniversary of the award of the Perkin Medal to Mr. Hall in recognition of his achievements in the aluminum industry. The dinner was attended by a number of subsequent Perkin medalists, the presidents of leading technical and engineering societies and officials of the Aluminum Co. of America and of other industries allied with aluminum.

Francis C. Frary, director of research, Aluminum Co. of America, New Kensington, Pa., acted as toastmaster and briefly outlined Mr. Hall's career, with the events which led up to his great discovery.

Technical and engineering progress over the last 50 years was reviewed briefly by Frederick M. Becket, vice-president, Electro Metallurgical Co., New York. Mr. Becket concerned himself principally with research and made a strong plea for its extension into

the fields of human endeavor which are not affected by commercial activities.

Alexander Klemm, Guggenheim School of Aeronautics, outlined the part aluminum has played in the development of transportation. While he admitted that the aeronautical industry had probably received the greatest benefits from Charles M. Hall's discovery, recent achievements in railroad transportation have now taken the spotlight out of the air. Mr. Klemm also expressed the belief that the tendency toward streamlining in automobile design would probably lead to decreases in the weight of motor cars and that here again aluminum might play a part.

In appreciation of the cooperation granted the aluminum industry during its 50 years of existence by the entire industrial world, Arthur V. Davis, chairman, Aluminum Co. of America, Pittsburgh, spoke briefly of his own experience. Mr. Davis was associated with Mr. Hall in the early development of the industry and told of its growth from a plant with a capacity of only 30 lb. a day to a major factor in industrial life with productive capacity of 300,000,000 lb. a year.

Philadelphia Rate Unchanged; Prices Again Show Weakness



Scrap Continues Upward Trend—
Pig Iron Competition Is Keener—
Steel Deliveries Slacken

PHILADELPHIA, Feb. 18.—This area is still crippled by inclement weather. Although the past several days have been warm enough to melt some snow, there is no indication that real relief will come for four to six weeks. Building construction and highway projects are at a standstill, and this condition is reflected in a cessation of releases for shapes and reinforcing bars. Likewise, operations at local shipyards are being hampered, with the result that less steel is being ordered. Local autobody stamping plants are on reduced schedules as a reflection of fewer automobile assemblies, and miscellaneous demand for steel likewise seems to have been discouraged to some extent by the weather.

Despite this temporary slackening in demand, all local steel sellers look forward to a moderately satisfactory first quarter and an even better second quarter. The most serious market situation currently is a demoralization of prices.

There has been widespread weakening in certain items, and all indications point to a general mark-down of published lists unless the situation changes. Second quarter quotations will probably not appear before the end of February, but there is little likelihood of increases in any direction.

All mills in this area are operating on schedules practically unchanged from a week ago. Consequently the district rate is maintained at 40 per cent of potential capacity.

Pig Iron

This product is becoming about the most competitive commodity in eastern Pennsylvania. Russian, Dutch and Indian irons are being offered to consumers, and, in addition, Frank Samuels & Co. are considering the importation of Belgium brands. Already a sizable tonnage of this latter iron has arrived at a New England port. A local concern has been appointed sales agent for the Steel Corpora-

tion's 42-lb. piglet, and representatives are carrying around a wooden model of this smaller pig in order to further the introduction of this iron in district foundries. New England's only furnace, the Mystic stack, will blow in early in April, and some of this iron will probably show up in this area. Likewise, there is possibility that the Colonial stack may be competitive before the middle of the summer. Republic and Jones & Laughlin intend to push their brands to a greater extent. Alan Wood's Swedeland furnace has been closed down for 10 days to two weeks for repairs, but following this shutdown it will be again in a position to supply merchant iron. Thus there are innumerable sources of iron, but currently there are very few outlets. Even though foundries and mills are operating at a comparatively satisfactory rate, they are sufficiently well stocked to carry them through at least another month. Consequently, current activity consists mostly of deliveries on old orders and quick shipments of carlots to small consumers who habitually purchase hand-to-mouth. The consensus among major sellers is that total February shipments will be about 20 per cent under January deliveries, mostly as a reflection of lessened consumption engendered by protracted near-zero weather.

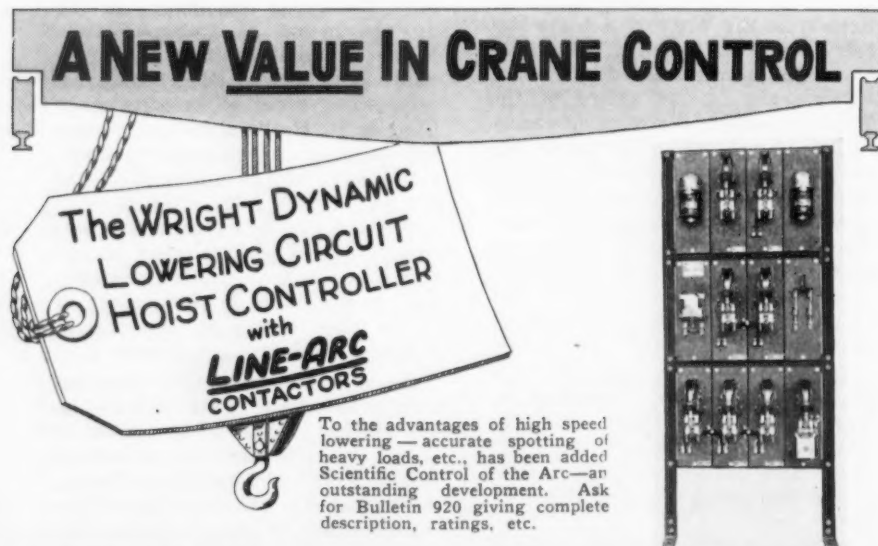
Sheets and Strip

Indications are that autobody stamping plants are consistently receiving concessions of \$3 a ton from published price levels for full-finished sheets. However, there is yet no indication that an additional \$2 concession which is currently being made in the Detroit area has been offered in this district. Also, there are scattered reports of \$3 reductions in strip. However, the tonnage turnover in this area is not sufficiently high to influence a widespread reduction by all sellers. Total turnover of sheets and strip is currently considerably under the January average. The principal outlets, autobody stamping plants, are operating at considerably reduced schedules, and, likewise, radio makers report slight reductions in output.

Bars, Plates and Shapes

These classes of steel are currently in poor demand. Building and highway construction are at a standstill, awards of steel are meager and new projects are few and far between. The brightest spot in the whole picture is shipbuilding, which should be operating on almost peak schedules throughout the remainder of the year. Releases from shipyards to several large mills are coming in each week and,

A NEW VALUE IN CRANE CONTROL



**The WRIGHT DYNAMIC
LOWERING CIRCUIT
HOIST CONTROLLER**
with
**LINE-ARC
CONTACTORS**

To the advantages of high speed lowering—accurate spotting of heavy loads, etc., has been added Scientific Control of the Arc—an outstanding development. Ask for Bulletin 920 giving complete description, ratings, etc.



The ELECTRIC CONTROLLER and MFG. CO., CLEVELAND, OHIO



**AUTOMATIC CONTROL for CRANES • MILL DRIVES and MACHINERY
BRAKES • LIMIT STOPS and LIFTING MAGNETS.**

SUPER-DREDNAUT—THE MODERN GOGGLE

WITH "DEEP CURVE" LENSES
CAN Provide MAXIMUM Protection



Super-Drednaut is the ONLY goggle that embodies all three of the following valuable features—

**Non-Rubber Headband—
Self-Adjusting Nose Bridge—
Super-Drednaut Lenses.**

Super-Drednaut Deep Curve lenses have proven through tests, long wear and hard usage that they provide a greater strength, greater resistance to blows than any other form of lenses, which means MAXIMUM eye protection and less eye injuries. It is today's MODERN goggle. Get a pair and put them to the test.

SAFETY EQUIPMENT SERVICE CO.

Buell W. Nutt, President—1228 St. Clair Ave., Cleveland, O.

Manufacturers of a Complete Line of Accident Prevention Equipment



CATALOG No. 10-A

Send for it TODAY

in addition, there has been a moderate volume of specifications from the Pennsylvania Railroad.

Imports

The following iron and steel imports were received here last week: 150 tons of steel bars, 153 tons of structural shapes, 22 tons of diamond plates, 13 tons of steel bands and 5 tons of hoop steel from Belgium; 25 tons of tungsten ore from China; 16 tons of manganese ore from Germany, and 28 tons of structural shapes from France.

Scrap

Prices for important grades continue their upward trend. No. 1 steel has been sold for over \$13.50, No. 2 steel has brought close to \$12.50, several mills purchased heavy breakable cast at \$13.50 last week and railroad grades are up an average of 50c. a ton. In many cases brokers have not benefited by the rising market inasmuch as continued severe weather accentuated their short position, and they have been forced to pay close to their selling prices for coverage on contracts. For instance, brokers are currently paying over \$13 openly for No. 1 at Coatesville, and bids for breakable cast at Coatesville and Harrisburg range around \$13. So far the milder weather has not eased scrap deliveries or collections, but if the thaw should continue for 10 days or so it seems likely that the pressure for supplies should be eased. Only negligible shipments are currently coming into this area from Baltimore, but there is a possibility that the large holdings in that area may be attracted to district consumers.

Boston Scrap Market Is Very Strong

BOSTON, Feb. 18.—A demand for steel turnings, bundled skeleton and breakable cast for Pennsylvania delivery has upped prices 50c. to 75c. a ton, and the market for No. 1 textile cast is firmer. Scrap prices otherwise, while unchanged, are very strong with indications of exporters increasing their bids this week to obtain necessary tonnages.

A steamer here is loading 7600 tons for Italy, and two boats with an aggregate of 6500 tons sailed recently for that country. Because of weather conditions and frozen scrap piles a local exporter has cancelled a boat contract scheduled for this week, and a loading at Providence, R. I. has been put forward for a while. Japan is no longer a potential export factor, yet each Japanese boat sailing from here takes a small tonnage of brake shoes or some other specialty. Five such steamers in January took 330 tons of steel scrap and a small tonnage of tin plate scrap. Higher prices for Nos. 1 and 2 steel at Pittsburgh are not reflected here because these materials are not moving to that district.

The pig iron market is marking time waiting for the opening of second quarter books on or about March 1. Based on current foundry melt, furnace representatives anticipate good business. Deliveries on old contracts are on schedule or anticipated, and domestic and India iron prices are firmly main-

tained. The Mystic Iron Works, Everett, Mass., is having the furnace relined preparatory to blowing in on or about April 1.

Modest tonnages of fabricated steel and reinforcing bars are hanging over the market. Actual contracts are slow in developing. As is usual in February, warehouse business has dropped to comparatively small proportions. Prices are holding steady.

Sheet Demand Lower At Cincinnati

CINCINNATI, Feb. 15.—Reported sales at higher prices in the Valley district have strengthened scrap market sentiment here. Dealers have moved bids up 50c. on all items, making heavy melting steel quotable at \$11.50 to \$12. In addition, available scrap in this area is less, following restriction in preparation of old materials because of cold weather. Barge shipments also have been curtailed by heavy ice floes. Mill purchasing is in small lots for urgencies, but recent dealer check-ups reveal users carrying substantial inventories on material ordered out on old commitments.

Pig iron demand is without noticeable feature. Current ordering is in small lots, but shipments on contract are steadily brisk. Prices on both northern and southern iron are steady. Foundry operations continue at a level of about 60 per cent of total capacity.

American Speed-Set

METAL NUMBERING MACHINES

MODEL P-5
MULTI-WHEEL SPEED SET

*Write for new catalog of
special machines for all
kinds of metal numbering.*



Wheels
Revolve
Either
Forwards
or
Backwards
Any
Combination
Almost
Instantly

AMERICAN NUMBERING MACHINE CO.

224 SHEPHERD AVENUE, BROOKLYN, N. Y.

105 W. MADISON STREET

CHICAGO, ILL.

Machine tool foundries are increasing their melt steadily. Jobbing plants are disappointing, but specialty foundries are in good production.

Warehouse demand, while showing a tendency to level off since Feb. 1, reflects heavier ordering than during the same period last year. Construction demand is small, but industrial business continues good.

Declines in automotive sheet demand and cold weather influences have depressed sheet orders to about 70 per cent of capacity. Small backlogs, however, will sustain mill operations at about 80 per cent of capacity this week.

Steel making activity is unchanged from last week, with output at 80 per cent. One interest is running all its open hearths.

Steel Demand Is Reviving in Northwest

SAN FRANCISCO, Feb. 17.—Certain indications of revival of industrial construction are seen in the Northwest, where bids have been opened on more than eight projects requiring fair tonnages. The trend is also shown in the California territory, as evidenced by the plant addition plans of the Douglas Aircraft Co., which include

700 tons of structural steel. Recent government aircraft awards have necessitated the third expansion move of this company in the past year.

The call for bids by the United States Engineers for 9553 tons of reinforcing bars for tunnel work at Fort Peck dam, in Montana, topped the new inquiries of the week. New bids are to be opened March 10 on the State livestock building, to be constructed at San Mateo, Cal., in which 1400 tons of bars and approximately 1300 tons of shapes are specified. Los Angeles county supervisors have called a bond election on the \$8,000,000 court house, which preliminary estimates show will require 8000 to 12,000 tons of structural steel. With strata drill tests being made for the Friant dam, a unit of the Central Valley project, construction bids may possibly be asked for within 90 days.

Bookings were fairly numerous and for fair tonnages. Judson-Pacific Co. took 700 tons of structural steel for an auditorium at Palo Alto, Cal., Chicago Bridge & Iron Works was awarded 320 tons of plates for two tanks at Alhambra, Cal., while Bethlehem Steel Co., Northwest Steel Rolling Mills, Wallace Bridge & Structural Steel Co. and Poole & McGonigle took 320 and 275 tons of bars and 300 and 310 tons of shapes respectively, on projects in the Northwest.

Railroad Activity Is Dominant at St. Louis

ST. LOUIS, Feb. 18.—The Missouri Pacific Railroad has issued inquiries for approximately 17,000 tons of 90 and 112-lb. rails and approximately 1,000,000 tie plates. The purchase of 300 steel-body box cars for use on the International & Great Northern Railroad to cost \$702,300 has been authorized by the Federal Court. The court also has authorized the Missouri Pacific to expend \$84,750 to install automobile-loading devices in cars.

Bids will be opened next Saturday for an intercity viaduct at Kansas City, requiring 1645 tons of structural steel and 1700 tons of reinforcing bars, which is a joint project of the Kansas and Missouri State Highway Commissions. John Epple Construction Co., St. Louis, is low bidder on the general contract for a ward building at State Hospital No. 1 at Fulton, Mo., requiring 150 tons of reinforcing bars.

Prices for scrap iron as paid by dealers in this market continue to advance sharply, as a result of a shortage in the supply rather than a demand by the consumers. The severe cold weather of the last few weeks has seriously retarded the handling and movement of scrap iron. There is said to be a considerable short interest among dealers, causing them to advance their buying prices in an effort to get material with which to fill contracts. Selected heavy steel, miscellaneous standard section rails, railroad springs, bundled sheets, rails for rolling, steel car axles, No. 1 machinery cast and No. 1 railroad cast are 50c. a ton higher; No. 2 heavy melting is 75c. a ton higher and No. 1 heavy melting and No. 2 railroad wrought, \$1 a ton up.

A strike of 500 enamel workers which had halted operations in the four largest stove foundries in Belleville has been settled, and operations were resumed yesterday, thus making for a greater consumption of pig iron.

Shipments of pig iron as well as sales are light, the trade still feeling the effects of the heavy movement during the latter part of the fourth quarter.

The Carnegie-Illinois Steel Corp. relighted blast furnace B of the Central furnaces at Cleveland on Feb. 12. This stack had just been reconditioned for producing commercial pig iron for trade in the Cleveland district.

Miscellaneous Steel Demand Sustained in New York Area



New Haven Railroad Is in Market for
1000 Freight Cars and 50 Coaches
— Construction Activity Awaits
Break in Weather

NEW YORK, Feb. 18.—With miscellaneous demand for finished steel products well sustained in the Metropolitan area, a sharp increase in demand is believed to be awaiting a break in the weather. Warmer days earlier in the week had an immediate favorable effect upon the releases reaching local sales offices, and this trend would certainly be continued if the weather man cooperated. Jobbers particularly have heavy back orders and would move their stocks immediately if transportation facilities permitted.

Construction in the New York district has been practically at a standstill for the past four weeks, and, in the meantime, building permits have been increasing. General contracts have been let on a number of large jobs and heavy inquiries for fabricated structural steel and reinforcing bars have appeared. Much grade crossing elimination and highway work is in the immediate offing and public projects will be rushed as soon as possible in order to increase employment in the election year.

Railroad activity continues to be the center of interest. The new York, New Haven & Hartford is in the market for 1000 box cars and 50 coaches, and, in view of this carrier's financial condition, the inquiry is believed to reflect the poor condition of railroad rolling stock in the East. The New Haven has purchased 10 small locomotives. The Lehigh Valley and the Delaware, Lackawanna & Western have placed most of the steel required for their car-building and repair program. The Alco Products Co. has booked 1900 tons of plates for a pipe line in the Bronx. Plate makers are also interested in prospective tank work, which is expected to bulk large as soon as the weather moderates. Barrel and drum manufacturers are active buyers of steel.

The price situation continues to be the most depressing factor in the current picture. The time has almost arrived for announcement of second-quarter quotations, and, in some instances, mills would be

hard put to decide what prices they were reaffirming in case current levels were to be maintained. Reinforcing bars are still very weak and wire nails are being freely quoted in the East at \$4 to \$6 a ton under the market. The \$3 a ton concession on sheets, which was first confined to the automotive industry, now seems to be much more general, and even deeper cuts are reported. Hot-rolled strip steel is also available at 1.70c., Pittsburgh, and cold-rolled is being shaded correspondingly. Pipe discounts are relatively firm, following the recent downward price revision. Quotations on merchant bars, plates and shapes are not affected notably, and tin plate, of course, is holding firm. Demand for tin plate is also improving rapidly.

Pig Iron

While for the time being sellers of pig iron in this district are still faced with an unenterprising consuming market, business prospects are brighter. Encouragement is seen in more favorable weather conditions, and in the contemplation of rising demands predicted for March. As previously pointed out, the bulk of January and February orders to date has been for special analysis irons which, as a rule, are not stocked by foundries, but are taken on a spot basis as special needs develop. The residual iron, going into whatever mixture may be required, is, of course, standard grade, and represents by far the greater percentage of the total mix. Since the bulk of the foundries in this district have been fulfilling the latter requirement by drawing from low-priced inventories, it is believed by observant dealers that these stocks are now nearing extinction, and will very shortly have to be replaced. Indications are, therefore, that beginning with March, such a program will commence to shape up, and purchases will gradually begin expanding.

Reinforcing Steel

No large tonnages have been reported this week in the reinforcing field and activities generally are

more quiet than at any time in the past month. With the award of the Triborough bridge work to Albert A. Volk the immediate future apparently holds only a few large jobs in prospect. No decision as yet has been made regarding the disposal of the tentative award to Rodgers & Hagerty of the 1000-ton sewer in the Bronx. Prices have been holding their own and perhaps are a little above average, but nothing startling has developed.

Scrap

The New York chapter of the Institute of Scrap Iron and Steel has authorized Saturday operation of all metropolitan yards in order that more steel will be liberated into consuming channels. For the past several weeks the severe weather has held up scrap collection and preparation, and brokers have found it almost impossible to obtain sufficient tonnages to meet scheduled domestic contract shipments. Likewise, export brokers have been spared sizable demurrage charges merely because the same weather which delayed their scrap accumulations fortunately held up chartered boats for periods generally long enough to permit the collection of full cargoes. Brokers are paying at least \$9.25 for No. 1 alongside barges, and \$8.25 for No. 2. Heavy breakable cast is up to \$8.25 for export shipment or for delivery to eastern Pennsylvania consumers. Other cast grades have also advanced slightly. A boat sailed yesterday carrying a full cargo of No. 2 to Italy, and another boat is expected in late in the week to pick up a cargo of mixed No. 1 and No. 2 for Japan.

Operations Maintained In Buffalo District

BUFFALO, Feb. 18.—The rate of operations is about the same as last week, with Bethlehem's Lackawanna plant operating nine open-hearths; Republic Steel Corp., two, and Wickwire-Spencer Steel Corp., one. The Seneca sheet division of Bethlehem is at about 75 per cent of capacity and rolling on the new continuous sheet mill is limited to experimental work.

An addition for the plant of the Trico Products Corp., Buffalo, involving 600 tons of fabricated structural steel was awarded to a local fabricator, as was a 100-ton job for the National Gypsum Co., Rotan, Tex. Bids were taken for a 100-ton post office at Rome, N. Y., with a Washington contractor low. A Wellsville contractor is low on

The success of this organization in supplying

TOOL STEELS

that are just right for the job to be done is due to the fact that it offers tool steel users only the best product of a few makers.

This selection is based on our years of experience and on our accumulated knowledge of what the world market offers.

A. MILNE & CO.

New York, N. Y., 745 Washington St., Tel. CHelsea 3-5315, Teletypewriter NY-1-146
Boston, Mass., 915 Oliver Building, Tel. Hancock 4999, Teletypewriter BOS-270

BRANCH OFFICES AND WAREHOUSES

Chicago, Ill., 17 N. May Street, Tel. Monroe 2996, Teletypewriter CGO-20
Detroit, Mich., 915 Harper Ave., Tel. MAdison 1170-1171
Pittsburgh, Pa., 604 Frick Bldg., Tel. Atlantic 2171
New Orleans, La., 611 So. Peters Street, Tel. RAymond 0011, Teletypewriter NO-83

Representatives elsewhere who can get in touch with you quickly

a 600-ton grade crossing and State highway job at Jamestown, N. Y.; a Buffalo contractor low on a Chemung County grade-crossing job involving 300 tons of steel, and a Rochester contractor low on a similar operation in Monroe County.

The scrap market is firm, with considerable material moving from nearby points to the Valley. Shippers of machine shop turnings have been able to get a price in outside districts equivalent to \$7.50 Buffalo. A report is current that a local mill has paid \$12 for No. 2 heavy melting steel, but this can not be verified. Dealers are raising their figures for No. 1, and most of them say they will not sell under \$13.50 under present conditions. Unless the No. 2 sale is an authentic report, users have shown little interest in buying over the past week.

Pig iron shipments are steady with a limited amount of new buying.

Ban on Tin Plate Scrap Exports Signed

WASHINGTON, Feb. 18. — President Roosevelt has signed the bill prohibiting exportation of tin plate scrap, except upon license issued by the President, after 60 days from enactment of the measure.

The President has issued an executive order delegating to the Secretary of State, as chairman of

the National Munitions Control Board, power to grant licenses on such conditions and under such regulations as provided by the act by and with the consent of the board. The Secretary has not as yet decided when he will call a meeting of the board to formulate rules and regulations. It is expected, however, that the board will be summoned at an early date.

Violation of the act is punishable by a fine of not more than \$500 or by imprisonment of not more than one year, or by both such fine and imprisonment.

Pipe Lines

East Texas Petroleum Co., Tower Petroleum Building, Dallas, Tex., has let 8-in. welded steel pipe line from Rodessa, La., oil fields to terminal at Longview, Tex., about 57 miles, for crude oil transmission. Pumping station will be built at Rodessa, with capacity for handling about 15,000 bbl. per day. Apex Construction Co. is general contractor and line is to be Lindewelded.

Producers Refining Co., West Branch, Mich., has authorized new welded steel pipe line from Ogemaw County oil field district to site of new oil refinery near West Branch, about 11 miles, for crude oil. A gathering system will be installed in oil field area noted, totaling about two miles of steel pipe. Carl J. Westlund is president.

Devon Oil Co., Ramsey Tower Building, Oklahoma City, Okla., has let contract to T. & P. Construction Co., same address, for about 9900 ft. of 6-in. welded steel pipe from point near Fourth Street to Kelley Street, for oil transmission. Cost about \$35,000.

Laughner Oil & Gas Co., Shippingport, Pa., plans welded steel pipe lines in parts of Hanover and Potter Townships, Beaver County, for natural gas supply for number of communities.

Marfa, Tex., plans early call for bids for steel pipe line system for natural gas distribution. Fund of \$70,000 has been arranged.

Sunset Beach Sanitary District, Sunset Beach, Orange County, Cal., plans about 1700 ft. of 6-in. welded steel pipe line for disposal of effluent from sewage disposal works.

Phillips Petroleum Co., Bartlesville, Okla., plans about 10,000 ft. of 10-in. welded steel pipe line near Rhode Island Avenue, Oklahoma City, for pressure natural gas transmission.

Martin Oil Co., Gainesville, Tex., plans steel pipe line from Talbott oil field area, near Gainesville, to point on Missouri-Kansas-Texas Railroad, where new bulk oil storage and distributing plant will be located for tank car loading. Steel pipe line oil gathering system is also planned in connection with drilling new wells in district noted.

Phillips Petroleum Co. has awarded contract to White Deere Pipe Line Co. for 40 miles of 2½ to 12-in. pipe at Hobbs, N. M., of which 33 miles will be Linde welded.

Scrap Institute Names Executive Committee

THE Executive Committee of the Institute of Scrap Iron and Steel has been appointed by Darwin Luntz, president of the institute. Each of the members of the executive committee will be a chairman of a standing committee of the institute. The first meeting of the executive committee will be held at the Statler Hotel, Cleveland, Feb. 25, at 11 a. m.

The executive committee will consist of the following: Ben Kaplan, M. S. Kaplan Co., Chicago, chairman of the chapter welfare committee; Phil W. Frieder, Philip W. Frieder Co., Cleveland, chairman of public relations committee; Herman D. Moskowitz, Schiavone-Bonomo Corp., New York, chairman of finance committee; Joel Claster, Luria Brothers & Co., Inc., Philadelphia, chairman of brokers' committee; L. J. Borinstein, A. Borinstein, Indianapolis, chairman of legislative committee; Ben Cohen, Louis Cohen & Son, Wilkes-Barre, Pa., chairman of yard dealers' committee; Edward L. Solomon, Max Solomon Co., Pittsburgh, chairman of arbitration committee; David J. Joseph, David J. Joseph Co., Cincinnati, chairman of export committee. W. J. Ross, Hyman-Michaels Co., Chicago, will act as chairman of the executive committee without portfolio.

National Machine Tool Builders Association, Cleveland, moved its offices Feb. 15 to larger quarters at 10525 Carnegie Avenue. It has previously occupied offices in the Guarantee Title Building.

Advance in Copper Prices by Certain Producers Drives in Heavy Orders

Sales to Establish 9.50c. Level Are Still Lacking—Tin More Active on Quota Rumors—Zinc Quiet—Lead Demand Dull

NEW YORK, Feb. 18.—Copper sales received a stimulus over the week-end when it became known that certain interests had advanced quotations ¼c. to 9.50c. a lb., Connecticut Valley. Sales in the domestic market on Feb. 14 aggregated 45,220 tons, and were the heaviest for any day's trading since August. On the day following 2280 tons were traded, and yesterday 6437 tons changed hands, raising the month's total bookings to 65,404 tons. Although higher quotations were demanded by certain interests, effective Feb. 15, and are still in effect at this time, no sales have been made on this basis. Consumers have been able to satisfy needs fully from sources which

are adhering to the 9.25c. level. Accordingly, the latter quotation remains official, and higher prices, where asked, have had no effect other than to retire those sellers involved from the domestic market. There are no indications at present that selling interests who continue to quote 9.25c. a lb. will advance to the higher level. Results of the Supreme Court's decision, sustaining the Government in TVA, may have slightly dampened enthusiasm in the market. Its condition today is much quieter. Abroad during the past week the market has advanced 25s., and electrolytic sold in London this morning at from 8.90c. to 9.01c. a lb. January statistics revealed that world stocks rose from

485,328 tons to 489,932 tons by the month's end. The domestic advance from 231,415 tons to 232,865 tons, being relatively less, was more favorable. Domestic refined production totaled 56,767 tons, against 59,547 tons in December. While shipments are not yet available, apparent consumption in this country rose from 43,972 tons to 52,663 tons.

Tin

In the past week little change occurred to dispel the market's apathy until Feb. 14 when, prompted by rumors that the coming meeting of the International Committee in Paris on Feb. 19, would result in a lowering of production quotas, consumers began covering more freely. Possibly 200 to 300 tons, for delivery as far forward as July, represented the total turnover. Subsequently, quota discussions have become less a factor, and the market is again comparatively quiet. Present available stocks are not large, but are more than sufficient to care for the demand, as, during the recent pick-up in this respect, future positions were strongly preferred. The price today for spot Straits metal at New York is 47.75c. a lb. In London this morning standard spot sold for £208, while futures were £200 10s. The Eastern price was £207 12s. 6d.

Lead

A further decline in volume of sales has occurred, but day-to-day bookings are still occupying the attention of sellers. March needs are thought to be approximately half covered at this point, and February is probably 95 per cent sold. April books will become a factor in less than two weeks. Meanwhile, new inquiry, though at a reduced rate, is fairly diversified, practically all types of consumers having been in the market at one time or another during the past fortnight. On the whole, the market is quiet, but not inactive, and prices are firm at 4.50c. and 4.55c. a lb.

Zinc

Trading in this commodity during the past week continued dull, the only encouragement being contributed by a substantial rise in the world price of zinc. Apparently the stage is set for a buying wave to get under way and for a possible advance in prices, but the indisposition of consumers to show more than a casual interest in the market at present acts as an effective deterrent to any such movement. Quotations are unchanged at the 4.85c. a lb. level.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 12	Feb. 13	Feb. 14	Feb. 15	Feb. 17	Feb. 18
Electrolytic copper, Conn.*	9.25	9.25	9.25	9.25	9.25	9.25
Lake copper, N. Y.	9.37½	9.37½	9.37½	9.37½	9.37½	9.37½
Straits tin, Spot, New York	48.00	47.75	47.75	48.12½	47.75	47.75
Zinc, East St. Louis	4.85	4.85	4.85	4.85	4.85	4.85
Zinc, New York†	5.22½	5.22½	5.22½	5.22½	5.22½	5.22½
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	4.35
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-22.00c. a lb., delivered.
Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.87½c. a lb., New York.
Quicksilver, \$77.50 to \$80.00 per flask.
Brass ingots, commercial 85-5-5-5, 9.50c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig	49.00c. to 50.00c.
Tin, bar	51.00c. to 52.00c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	16.50c.
*High brass sheets	14.62½c.
*Seamless brass tubes	16.87½c.
*Seamless copper tubes	17.00c.
*Brass rods	13.12½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	6.00c. to 7.00c.
Lead, sheets, cut	8.25c.
Antimony, Asiatic	14.00c. to 15.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ⅓	29.50c. to 30.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig	53.00c.
Tin, bar	55.00c.

Copper, Lake	10.25c. to 10.50c.
Copper, electrolytic	10.25c. to 10.50c.
Copper, castings	10.00c. to 10.25c.
Zinc, slabs	6.25c. to 6.50c.
Lead, American pig	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	17.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	57.00c.
Solder, ½ and ⅓	30.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.12½c.	7.87½c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.00c.	6.50c.
Brass, heavy	4.00c.	4.62½c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.00c.	6.50c.
No. 1 yel. brass turnings	5.12½c.	5.62½c.
No. 1 red brass or compos. turnings	5.62½c.	6.12½c.
Lead, heavy	3.50c.	3.87½c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.



Plant Expansion and Equipment Buying

Machine Tool Buying on Steady Plane Without Benefits of Large Closings

ORDERS for machine tools are well sustained, even though the closing of outstanding lists is not a factor. The automotive industry seems to be delaying purchases to some extent, but a number of large units are expected to place large orders in the near future with as little advance notice as possible.

Export demand is holding up, although the present régime in Germany has seriously affected the importation of American tools. Under the circumstances German plants of United States automobile companies find themselves required to buy tools and machinery locally.

A number of makers of lathes have advanced prices approximately 10 per cent and more recently a similar increase has been made on boring mills. The higher prices may lead to the placing of heavier orders for tools of these types.

◀ NORTH ATLANTIC ▶

Johns-Manville Corp., 22 East Fortieth Street, New York, manufacturer of roofing products, insulating board and other building specialties, has let general contract to George P. Glover Co., Inc., Whitney Building, New Orleans, for main one-story mill for new plant in Jefferson Parish, near New Orleans, where 60-acre tract was recently purchased. It will be 150 x 800 ft., supplemented with several smaller units, including machine shop and other mechanical departments. Company will move present branch plant at Gretna, La., to new works later. Cost about \$750,000 with equipment. R. B. Murphy, manager at Gretna plant, will be manager at new mill. S. A. Williams is vice-president in charge of mines and plants.

Ipamco Pipe Corp., 32 Liberty Street, New York, is considering new bulk oil storage and distributing plant at Chelsea, Mass., with steel tanks and other equipment. Cost close to \$85,000 with equipment.

Pneumatic Hi-Jack Corp., 500 Fifth Avenue, New York, has leased building at 9-17 Thirty-seventh Avenue, Long Island City, for new plant.

Paul Munk & Co., 36-11 Thirty-third Street, Long Island City, plumbing specialties, have leased about 15,000 sq. ft. in Karpen Building, Northern Boulevard, for new works, expanding present capacity.

A. P. W. Paper Co., 1273 Broadway, Albany, N. Y., manufacturer of paper products, has asked bids on general contract for addition to mill on Bridge Street,

and improvements in present plant units. Cost over \$200,000 with machinery. Johnson & Wierk, Grand Central Terminal, New York, are consulting engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 25 for 27,000 lb. brass voice tubing for Brooklyn and Philadelphia navy yards (Schedule 7235); until Feb. 28, one electric arc welding set (Schedule 7220), 200,000 ft. insulated electric cable (Schedule 7248) for Brooklyn yard.

Central School District, Stamford, N. Y., J. A. Tooley, president, plans manual training department in new three-story school, for which bids will be asked soon on general contract. Cost about \$500,000. Financing has been arranged through Federal aid H. O. Fullerton, 152 Washington Street, Albany, N. Y., is architect.

Weber & Quinn, 73 Ninth Street, Brooklyn, fuel oil and coal distributors, have filed plans for one-story bulk oil storage and distributing plant, 145 x 150 ft. Cost over \$50,000 with equipment. E. W. Warff is company architect.

Quartermaster, United States Army Academy, West Point, N. Y., asks bids until Feb. 24 for saw blades, files, dry batteries and other supplies (Circular 78); until March 11, 325 steel double lockers (Circular 76).

Signal Supply Officer, Army Base, Brooklyn, asks bids until March 2 for 7040 ft. of cable and six reels (Circular 133).

National Can Co., Inc., 110 East Forty-second Street, New York, plans extensions and improvements in branch plant near Clarksburg, W. Va. Cost close to \$40,000

with equipment. C. E. Margeson is superintendent at Clarksburg.

Board of Education, 417 South Broad Street, Elizabeth, N. J., has let general contract to Fatzler Co., 11 Hill Street, Newark, N. J., for new three-story vocational school, and will begin superstructure at once. Cost about \$400,000. Financing has been arranged through Federal aid.

Charles F. Guyon, Inc., 501 Fifth Avenue, New York, manufacturer of pipe fittings, valves, steam specialties, etc., with main plant at Passaic, N. J., has acquired former plant of Boynton Furnace Co., Whiton and Pine streets, Jersey City, N. J., one-story, with about 60,000 sq. ft. floor space, for new factory branch for processing storage and distribution. Present plant at North Bergen, N. J., will be removed to new location and capacity increased.

Board of Education, East Orange, N. J., plans manual training department in new three-story junior high school at Renshaw Avenue and North Clinton Street. Cost about \$625,000. Guilbert & Betelle, 20 Branford Place, Newark, N. J., are architects.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until Feb. 24 for gages (Circular 333); until March 4, two power hacksaws (Circular 328); until March 12, one nose heating furnace for H. E. shells (Circular 334).

Crown Cork & Seal Co., Inc., Eastern Avenue and Kresson Street, Baltimore, has purchased controlling interest in Acme Can Co., Philadelphia, and will operate as a subsidiary for manufacture of tin cans and other metal containers, a new line of output for company.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until Feb. 25 for 50 piston forgings and one forging die (S. & A. Req. 6176), 25 exhaust valves and 25 intake valves (S. & A. Req. 6178).

◀ NEW ENGLAND ▶

United Aircraft Corp., East Hartford, Conn., plans new one-story plant near present works for exclusive production of propellers and allied equipment. Space now used for such output in East Hartford plant of Pratt & Whitney Aircraft Co., a unit of organization, will be given over to increased manufacture of aircraft engines and parts. First noted company also plans expansion in works of Sikorsky Aviation Co., Stratford, Conn., another unit, for larger output of transport amphibians and large flying boats, including parts production and assembling. Arrangements have been made by parent company for increase in capital from 2,400,000 to 3,000,000 shares of stock, considerable part of proceeds to be used for purpose noted.

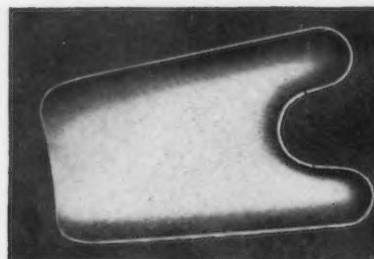
Lever Brothers Co., 164 Broadway, Cambridge, Mass., manufacturer of soaps, oils, etc., plans three-story addition to plant at Toronto, Ont., operated in name of Lever Brothers, Ltd. Cost close to \$1,000,000 with



FERRO-ALLOYS
in the making

Ohio Ferro-Alloys Corporation
Canton, Ohio

TO THE AID OF BEAUTY



Another Casting Problem SOLVED by PERMITE!

A PRODUCER of shampoo boards for beauty shop chairs wanted an improved board. He wanted light weight, strength, a smooth finish, good appearance.

All these, and more, he secured in Permitem Aluminum Alloy Castings. Made in a permanent mold from the proper aluminum alloy, Permitem Castings gave him light weight, strength, uniformity, and that close grain structure which permits a highly polished, sanitary finish. Faster and easier polishing of these castings resulted in lower production costs.

Put your casting problems up to this pioneer in the aluminum field. Learn how Permitem's advanced and complete facilities offer you improved quality, and in many cases lower costs. Write for details, or send blueprints for confidential recommendations and quotations.

ALUMINUM INDUSTRIES, INC., Cincinnati, O.

Branch Offices: Chicago, 616 So. Michigan Ave. . . . Detroit, 718 Fisher Bldg.

PERMITE *Aluminum Alloy* CASTINGS

Permanent Mold ★ Semi-Permanent Mold

machinery. Ewart, Armer & Byam, Toronto, are architects and engineers.

Gaetano & Sons, Milford, Conn., manufacturers of forgings, etc., plan new one-story forge shop, 40 x 120 ft. Cost over \$35,000 with equipment. Peter P. Petrofsky, Bridgeport, Conn., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 25 for one motor-driven ball-bearing scroll-sawing machine for Boston Navy Yard (Schedule 7220); until Feb. 28, one motor-driven forging machine for Portsmouth, N. H., yard (Schedule 7229); 1950 alloy steel forgings (Schedule 7160), and naval brass forgings (Schedule 7236) for Newport, R. I., naval station.

◀ SOUTHWEST ▶

Standard Oil Co., Fortieth and Main Streets, Kansas City, Mo., plans new bulk

oil storage and distributing plant at Armourdale, Kan. Cost close to \$35,000 with steel tanks and other equipment.

KWK Broadcasting Station, Hotel Chase, St. Louis, operated by Thomas Patrick, Inc., has purchased about 15 acres at North St. Louis, for new transmitting station, with 400-ft. radio tower, transmitter building, antenna and other structures. Cost about \$100,000 with equipment.

Bi-Partisan Advisory Board, Capitol Building, Jefferson City, Mo., Edgar M. Eagan, executive secretary, has authorized plans for new steam power plant at local State penitentiary. Cost over \$350,000 with equipment. E. S. Klein, 315 North Seventh Street, St. Louis, is consulting engineer; Charles A. Haskins, Finance Building, Kansas City, Mo., is supervising engineer.

Dade County Mining Co., Inc., Greenfield, Mo., has begun erection of new ore concentration mill at zinc mining proper-

ties, about 10 miles from Greenfield, and plans early purchase of mine-operating machinery, including crushers, rolls, concentrating tables and other milling equipment, cars, loaders, conveyors, etc. Cost over \$80,000 with machinery.

Baker Oil Tools, Inc., 2301 Commerce Street, Houston, Tex., manufacturer of oil well drilling machinery, parts, etc., with main plant at Los Angeles, has acquired five-acre tract on Navigation Boulevard, Houston, for new works, consisting of one-story units to cover an area 65 x 500 ft., with machine shop, tool shop and other structures. Work on first two units, 40 x 65 ft., and 60 x 65 ft., will begin in March. Cost close to \$60,000 with equipment. William A. Burnet, Shell Building, Houston, is construction engineer.

Parade Gasoline Co., Shreveport, La., plans extensions and improvements in gasoline refinery near Henderson, Tex., including new equipment, storage and distributing facilities. In addition to immediate work to cost about \$125,000 with equipment, company will install new butane gas extraction plant early in spring to cost over \$275,000 with machinery.

◀ BUFFALO DISTRICT ▶

Colonial Radio Corp., 254 Rano Street, Buffalo, has taken out a permit for one and two-story addition, 25 x 100 ft., and improvements in present plant. Cost close to \$40,000 with equipment.

Board of Education, Newark, N. J., plans manual training department in new two-story school, for which bids will be asked on general contract early in spring. Cost about \$500,000. Carl C. Ade, 80 East Avenue, Rochester, N. Y., is architect.

Niagara, Lockport & Ontario Power Co., Electric Building, Buffalo, plans extensions in transmission lines near Medina, N. Y., with electrical distributing lines and service facilities for rural electrification, totaling over 325 miles. Cost about \$400,000.

◀ SOUTH ATLANTIC ▶

Gastonia Coca-Cola Co., Gastonia, N. C., has awarded general contract to A. H. Guion Co., Kenney Building, Charlotte, N. C., for one-story mechanical bottling plant. Cost about \$35,000 with equipment.

District Quartermaster, CCC, Charleston, S. C., asks bids until Feb. 25 for six table saws, six wood turning lathes, six jointer planers and five electric motors (Circular 41).

South Carolina Rural Electrification Authority, Columbia, S. C., plans new transmission and distributing lines for rural electrification in different parts of State, totaling over 1300 miles, with power substation, switching and service facilities. Cost close to \$1,300,000. Financing is being arranged through Federal aid.

Walnut Cove Veneer Co., Walnut Cove, N. C., plans rebuilding part of electric-operated veneer mill recently destroyed by fire. Loss over \$50,000 with equipment.

District Quartermaster, Fort Barrancas, Fla., asks bids until Feb. 24 for one hand-power baling machine (Circular 100).

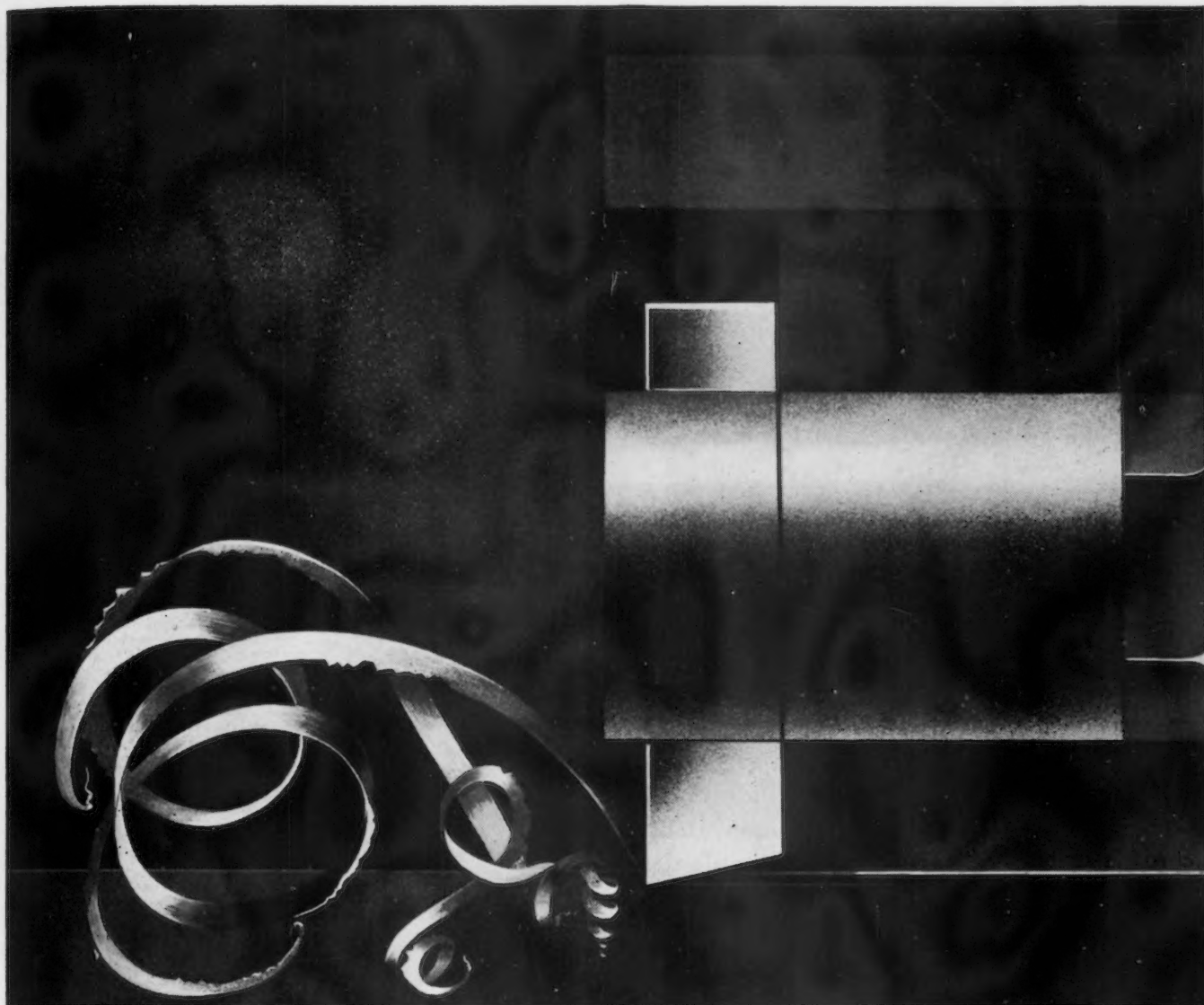
◀ WASHINGTON DIST. ▶

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 27 for 70,000 ft. copper-covered wire, 4000 lb. bare wire, 10,000 lb. steel track spikes, 5000 lb. steel track bolts, 200 10-gal. paint drums, 2000 5-gal. cans, paint pails, galvanized garbage cans, warehouse barrel trucks and other equipment (Schedule 3125).

Mutual Chemical Co., of America, Inc., Block and Willis Streets, Baltimore, has let general contract to E. Eyring & Sons Co., 808 South Conkling Street, for two-story addition. Cost over \$30,000 with equipment.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Feb. 24 for automobile parts (Circular 103).

Neuhoff, Inc., 1803 Holliday Street, Lynchburg, Va., meat packer, has let general contract to Martin Brothers, Inc., 209 First Street, S. W., Roanoke, Va., for two-



MOLY pares machining costs

MACHINE SHOP cost sheets often contain an accumulation of items that are avoidable. Some are caused by hold-overs from other processes—rolled-in scale—non-uniform hardness—distorted parts—meaning excessive tool, labor and material costs.

They are avoidable by standardizing on Molybdenum steels. Forgings are less likely to be scaly, seamed, or temper brittle. Carburized parts are less apt to be inconsistently distorted. High cutting speeds are safer and close tolerances more easily maintained. Time, power, labor, tool and material costs can be greatly reduced.

One maker of tool joints for oil-well service—a

high-volume precision job—reports a 10% saving in over-all machine costs by standardizing on Chrome Moly steel (SAE 4140).

Your particular case may not be exactly similar, but—the savings in production costs effected by Moly steels and irons are not confined to the machine shop. So, it will pay you to investigate Moly in connection with your own problems. Our laboratory facilities are available if you are interested. Meantime our helpful technical book, "Molybdenum," is yours for the asking—as is also our periodically published news-sheet, "The Moly Matrix." Climax Molybdenum Company, 500 Fifth Avenue, New York.

CUTS COSTS **CLIMAX Mo-lyb-den-um** **CREATES SALES**

- ★Smooth acceleration and deceleration
- ★Accurate Stepless Speed Control . . . Minimum to Maximum in either direction

- ★Automatic Load Indication and Overload Protection
- ★Flexible Location with Hand, Automatic or Remote Control
- ★High Efficiency, Low Maintenance
- ★Smaller Size, Lower Cost



"Simply Amazing Control"

USER after user finds that the New Oilgear Fluid Power Variable Speed Transmission gives startling results in accuracy, ease and stepless variation of speed control. The new simple design brings exceptional compactness, higher speeds and wide usefulness at lower cost. Altogether, Oilgear is the most talked-about development in the transmission field. Be sure you know all about it. Write today for Bulletin 60000. THE OILGEAR COMPANY, 1311 W. Bruce Street, Milwaukee, Wisconsin.



OILGEAR *Fluid Power* VARIABLE SPEED TRANSMISSIONS

story plant on site recently acquired at Salem, Va. Present plant will be removed to new location and capacity increased. Cost about \$100,000 with equipment.

Chemical Warfare Service, Edgewood Arsenal, Baltimore, asks bids until Feb. 24 for one carbon monoxide exhauster and one air heater (Circular 48), and carbon monoxide meter, chlorine meter, cast iron scrubber throat pieces, etc. (Circular 49).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 25 for 12 motor-driven polishing and buffing lathes (Schedule 7240); until March 3, one motor-driven centerless grinder (Schedule 7219) for Washington yard; until Feb. 28, rubber-insulated electric wire and electric cable (Schedule 7209) for Norfolk, Va., Navy Yard; 134,000 flashlight batteries and 16,000 dry batteries (Schedule 7179), single conductor cable, lighting and power cable, and portable cable (Schedule 7214); until March 3, 11,300 aluminum powder tanks (Schedule 7225) for Eastern and Western yards; until Feb. 25, steel forgings and welded assemblies (Schedule 7194) for Philadelphia yard; one motor-driven screw-cutting bench lathe (Schedule 7221) for Dahlgren yard.

Schoenling Ice & Fuel Co., 1624 Central Avenue, Cincinnati, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for two-story and basement addition to brewery, 46 x 160 ft., primarily for a mechanical bottling works. Cost over \$60,000 with equipment.

◀ OHIO AND INDIANA ▶

Schoenling Ice & Fuel Co., 1624 Central Avenue, Cincinnati, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for two-story and basement addition to brewery, 46 x 160 ft., primarily for a mechanical bottling works. Cost over \$60,000 with equipment.

Feick Mfg. Co., Cleveland, recently organized to manufacture sheet metal products, including advertising novelties, has leased about 10,000 sq. ft. in building at 10225 Meech Avenue, S. E., for plant. Harry W. Feick, formerly identified with Par-Brook Mfg. Co., 4600 Brookpark Road, is head.

Dobeckmun Co., 3301 Monroe Avenue, Cleveland, manufacturer of cellophane containers, has let general contract to Bison Co., 12406 Marston Avenue, for one and two-story addition to converting plant, 115 x 120 ft. Cost about \$70,000 with machinery. George S. Rider Co., Marshall Building, is architect and engineer.

Allied Printing & Binding Machinery, Inc., 1975 East Sixty-fifth Street, Cleveland, will soon take bids on general contract for one-story addition, 75 x 200 ft., at 3700 Chester Avenue. Cost about \$60,000 with equipment. Edward G. Boesler, 5005 Euclid Avenue, is architect.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 24 for one electric oven (Circular 581); until Feb. 25, seven tachometers (Circular 558), two motor-driven converters (Circular 576); until Feb. 26, 32 2-qt. and 16 4-qt. electric glue pots (Circular 566), 15 switchbox assemblies (Circular 562); until Feb. 27, 25 tail wheel fork assemblies, stabilizer screws and stabilizer trunnions (Circular 556), globe valves (Circular 548), one grinder, with tractor hitch, complete with independent block-type scarifier (Circular 546); until Feb. 28, 15 light-duty tractors, 25 tractor-mowers, complete with spare 7-ft. knife, and five light-duty tractors with rotary brush scraper (Circular 543), four photographic lamp assemblies (Circular 568), 220 gun charging control assemblies, 400 gun charging handle assemblies, 430 wind vane sight assemblies, 348 ring sight assemblies, 610 gun sight mount assemblies and 150 gun sight assemblies (Circular 549).

Howe Fire Apparatus Co., Anderson, Ind., manufacturer of fire-fighting equipment, plans rebuilding part of plant at North Anderson recently destroyed by fire. Loss about \$40,000 with equipment. Company will secure temporary quarters for production of main equipment, including pumpers and hose trucks, pending reconstruction.

Chevrolet Body Corp., 1100 West Henry Street, Indianapolis, affiliated with Chevrolet Motor Co., Detroit, has filed plans for one-story addition. Cost about \$300,000 with equipment.

◀ MIDDLE WEST ▶

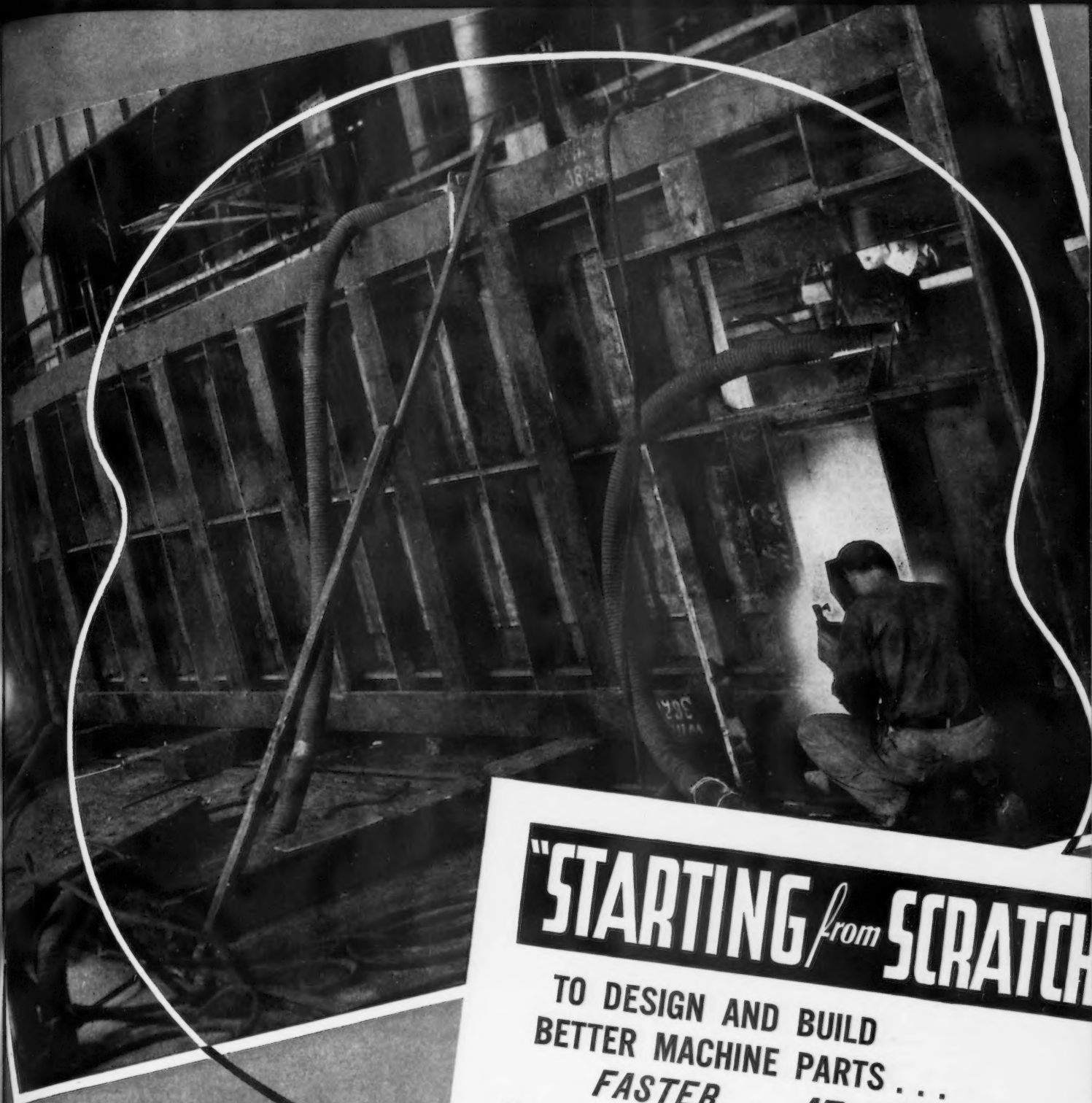
Bureau of Reclamation, Denver, asks bids until Feb. 27 for 19 motor-driven radial gate hoists, 19 gate-position indicators, new parts for 19 radial gates, pipe hand railings and accessory equipment for Stewart Mountain dam (Specifications 676-D).

United States Gypsum Co., 300 West Adams Street, Chicago, manufacturer of building products, wallboard, etc., has let general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for one-story addition to branch mill at Greenville, Miss., 150 x 230 ft. Cost close to \$150,000 with equipment. Company has taken over factory at 1253 Diversey Parkway, Chicago, and will remodel for new plant. Cost over \$50,000 with equipment.

Hiram Walker & Sons, Inc., Peoria, Ill., distiller, has asked bids on general contract for multi-story addition for storage and distribution. Cost over \$80,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects and engineers.

Howard County Rural Public Power District, St. Paul, Neb., care of J. C. Toman, St. Paul, president, plans new transmission and distributing lines in different parts of county for rural electrification, including power substation and service facilities, totaling over 500 miles. Cost close to \$600,000. Financing will be arranged through Federal aid. H. H. Henningson, Union State Bank Building, Omaha, Neb., is consulting engineer.

St. Cloud Brewing Co., Eighth Avenue North and Sixth Street, St. Cloud, Minn., has plans for one-story and basement addition, 70 x 70 ft., in part for storage and distribution. Cost about \$35,000 with equipment.



DANLY MACHINE SPECIALTIES, Inc.
 106 South 52nd Ave., Chicago, Illinois

BRANCHES:

- | | |
|-------------------------------------|-------------------------|
| 6-12 34th Street | Long Island City, N. Y. |
| 4-116 N. St. Clair Street | Dayton, Ohio |
| 49 Temple Avenue | Detroit, Mich. |
| Commercial Street | Rochester, N. Y. |
| 444 E. 49th Street | Cleveland, Ohio |
| 713 N. Broad Street | Philadelphia, Pa. |

DANLY SMITHWELDING

ENGINEERED BY DANLY

"STARTING *from* SCRATCH

TO DESIGN AND BUILD
 BETTER MACHINE PARTS . . .
 FASTER . . . AT LOWER COST

The designers of DANLY-SMITHWelding start every new job from "scratch" with a careful analysis of the functions of the machine and its parts. They know from experience every possibility in machine design from rolled steel.

ENGINEERED BY DANLY is another way of saying "the ability to design—plus the facilities to produce"—that enables you to "cash-in" on all the possible benefits resulting from rolled steel construction by the Torch Cut and Weld Method.

FOR the most modern in rolled steel construction—
 design—savings—and set-up—send for the new
 book "Welding for the Mechanical Industries"

ment. Louis C. Pinault, Lahr Building, is architect.

Air Reduction Sales Co., Minneapolis, Minn., manufacturer of industrial gases, etc., plans rebuilding part of local plant recently destroyed by fire. Loss over \$30,000 with equipment. Company headquarters are at 30 East Forty-second Street, New York.

United States Engineer Office, Fort Peck, Mont., asks bids until Feb. 24 for one electric-operated automobile lift (Circular 323), 84 pressure oilers, 24 dies, striking hammers, blades and pins, barrel pumps, galvanized water pails and other equipment (Circular 320).

Kempsmith Machine Co., Milwaukee, has been incorporated by Paul G. and Ann M. Hoppe, 3121 West Lisbon Avenue, and Thomas Kattnig, 404 North Plankinton Avenue, to take over manufacture of milling machines and parts business of the former Kempsmith Mfg. Co., 5325 West Rogers Street, which retired from business Oct. 1, 1935, after liquidating following foreclosure. New company is resuming production of millers and parts in leased space in former Kempsmith plant. Mr. Hoppe was associated with the Kempsmith Mfg. Co. for many years. Mr. Kattnig is head of the Kattnig Machine & Supply Co. and Arkco Engineering Co., 1819 South Seventy-first Street.

Lake Wausau Granite Co., Wausau, Wis., plans early erection of new processing and finishing plant, 50 x 350 ft., to replace building burned Jan. 22. Cost about \$50,000, including equipment. A. F. Kell is general manager.

Ace Piston Ring Co., Inc., Spooner, Wis., has been organized by local and Minneapolis interests to succeed to automotive specialty manufacturing business established in Minneapolis year ago. Plant will be transferred to Spooner, sales office remaining in Minneapolis. Guy Benson is president, and Bert Hopper, chief engineer.

◀ SOUTH CENTRAL ▶

Alabama Power Co., Birmingham, is arranging fund of \$9,700,000 for extensions, improvements and maintenance in plants and system, including power station betterments and equipment replacements, power substations and other structures. Of sum noted, about \$2,500,000 will be expended for rural electrification, including new transmission and distributing lines.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until March 3 for fabricating, galvanizing and furnishing steel grating, floor plates, and appurtenances for Pickwick Landing Lock; until Feb. 27, for 161-kv. outdoor disconnecting switches for switchyard at Norris hydroelectric power plant.

Board of Water Commissioners, Richmond, Ky., William O'Neill, chairman, plans extensions and improvements in municipal waterworks, including electrification of pumping plant, new elevated steel tank and tower, filtration works and other structures. Cost about \$100,000 with equipment. J. S. Watkins, Citizens Bank & Trust Building, Lexington, Ky., is consulting engineer.

United States Engineer Office, Vicksburg, Miss., asks bids until March 9 for forged steel weldless turnbuckles with stud end, and galvanized wire rope clips (Circular 184).

City Council, Chattanooga, Tenn., has plans for new hangar, 125 x 145 ft., with shop and reconditioning department, 25 x 50 ft., adjoining, at Lovell Field. Cost over \$80,000 with equipment. Gordon L. Smith, Chattanooga, is architect.

◀ WESTERN PA. DIST. ▶

H. J. Heinz Co., 1062 Progress Street, Northside, Pittsburgh, food canner and packer, plans multi-story addition to branch plant at Leamington, Ont. Cost close to \$150,000 with equipment. Hutton & Souter, Piggott Building, Hamilton, Ont., are architects.

Bureau of Water, City-County Building, Pittsburgh, plans extensions and improvements in Ross waterworks station, including new 600-hp. boiler unit and auxiliaries, high-pressure pumping unit and other

equipment. Cost about \$135,000. Appropriation is being arranged by City Council.

Dudley Electric & Machine Co., Uniontown, Pa., manufacturer of electric commutators and other electrical equipment, plans rebuilding part of plant recently destroyed by fire. Loss over \$60,000 with equipment.

City Council, Erie, Pa., plans new municipal airport at West Lake and Asbury Chapel Roads, including hangars, repair and reconditioning shops, oil storage and distributing building, administration building and other units. Cost close to \$375,000 with equipment. A. N. Aitkin, City Hall, is city engineer.

◀ MICHIGAN DISTRICT ▶

Buell Die & Machine Co., 3535 Scotten Avenue, Detroit, has plans for one-story addition. Cost about \$25,000 with equipment. H. D. Igenfritz, 468 Prentiss Street, is architect.

Northern Refineries, Inc., Alma, Mich., recently organized with capital of \$150,000 by Joseph H. Fitchett, Alma, and associates, plans new local oil refinery. Cost close to \$100,000 with equipment, including storage and distributing tanks and facilities for gasoline, fuel oil, distillates, etc. Company is arranging financing. E. G. Guy, Mount Pleasant, Mich., is engineer.

Michigan Brewing Co., North Ionia Street, Grand Rapids, Mich., has let general contract to Strong Construction Co., Grand Rapids, for addition, for which sub-contracts will be let soon. Cost over \$200,000 with machinery. Don Lakie, Grand Rapids, is architect.

Minnesota Mining & Mfg. Co., Forest Street, St. Paul, Minn., manufacturer of abrasive materials, roofing products, etc., has acquired about three acres with one-story plant unit at Detroit, formerly held by Studebaker Corp., and will remodel for production of special rubber cements. Cost over \$70,000 with equipment.

Board of City Commissioners, Wakefield, Mich., plans new municipal electric light and power plant. Cost about \$60,000. Financing will be arranged through Federal aid.

◀ PACIFIC COAST ▶

Metropolitan Water District, 306 West Third Street, Los Angeles, F. E. Weymouth, general manager and chief engineer, asks bids until March 13 for new electric-operated pumping plant in Eagle Mountain district, near Desert Centre, Cal., for Colorado River Aqueduct system, including inlet works, outlet structures, electrical switching station and other structures (Specification No. 143). Cost estimated over \$1,000,000.

Coca-Cola Bottling Co., 1314 South Central Avenue, Los Angeles, has plans for new one-story storage and distributing plant, 79 x 155 ft. Cost over \$30,000 with conveying and mechanical-handling equipment, etc. Robert V. Derrah, 9470 Santa Monica Boulevard, Beverly Hills, Los Angeles, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 26 for two motor-driven pipe-threading machines (Schedule 7184); until Feb. 28, 9000 doz. hacksaw blades (Schedule 7216) for Mare Island Navy Yard; one motor-driven pipe-threading machine (Schedule 7218) for San Pedro, Los Angeles, naval station; until March 3, one motor-driven universal cutter and tool grinder (Schedule 7226) for Puget Sound yard.

Seattle Brewing & Malting Co., 3030 Airport Way, Seattle, has let general contract to A. W. Quist Co., Exchange Building, for four-story addition, 66 x 100 ft., for storage and distribution, and one-story extension for mechanical-bottling works. Cost close to \$90,000 with equipment. Joseph Wohleb, Chambers Building, Olympia, Wash., is architect.

California Well Tool Co., 1033 Alhambra Avenue, Los Angeles, manufacturer of oil well drilling tools and equipment, has let general contract to Pacific Iron & Steel Co., 241 West Avenue 26, for one-story forge shop, 40 x 68 ft.

Board of Kern County Supervisors, Bakersfield, Cal., will begin superstructure for new hangar, 132 x 300 ft., with repair and reconditioning shop, at County Airport. Cost about \$100,000 with equipment. Charles H. Biggar, Haberfelde Building, is architect; L. H. Nishkian, 525 Market Street, San Francisco, is engineer.

◀ FOREIGN ▶

Victoria State Electricity Commission, 32 King William Street, Sydney, Australia, asks bids until March 16 for insulated copper cables (Specification 36/4); until March 23, solid drawn steel boiler tubes (Specification 36/10) for Yallourn power station.

British Aluminium Co., Ltd., London, England, plans new works near Stoke-on-Trent, England, comprising rolling mill, power house and other units. Cost about \$750,000 with equipment.

Distillers & Brewers Corp. of America, Inc., 26 Exchange Place, Jersey City, N. J., is planning establishment of new distillery at Glasgow, Scotland. Negotiations are under way with A. P. McDowall & Co., Ltd., last noted place, distiller, for purchase of one of its plants, to be expanded for increased output.

NEW TRADE PUBLICATIONS

Steel Plate Construction.—William B. Pollock Co., Youngstown. Circular describing and illustrating special cars for heavy industries.

Air Heating.—L. J. Wing Mfg. Co., New York. Bulletin explaining heater for warming cold air at door openings, freight platforms, garages, bus terminals, etc. Complete with diagrams and illustrations.

Lathes.—Monarch Machine Tool Co., Sidney, Ohio. Catalog insert illustrating and describing new direct reading length dials for all sizes of Monarch lathes.

Turret Lathes.—Gisholt Machine Co., Madison, Wis. Booklet entitled, "Gisholt on Parade," with large, bled page, action pictures of the company's ram-type, high-production, and heavy-duty turret lathes, the Gisholt Simplimatic automatic chucking lathe, and both static and dynamic precision balancing machines.

Nickel-Clad Steel Fabrication.—Lukens Steel Co., Coatesville, Pa. Illustrated bulletin T-4 devoted to methods for the fabrication of Lukens nickel-clad steel plate, including hot and cold working, surface cleaning, joining by metallic and carbon arc, acetylene, atomic hydrogen and forge welding processes. Applications of nickel-clad material are listed.

Reinforced Concrete Pipe.—American Concrete & Steel Pipe Co., Los Angeles. Attractive 72-page catalog outlining development of the concrete pipe industry and illustrating and describing Hume centrifugal and other concrete pipe, including various installations of large size units. Useful data include logarithmic diagrams pertaining to the flow of water in concrete pipe.

Silent Chain Drives.—Ramsey Chain Co., Albany. Nineteen-page booklet entitled "The A-B-C of Silent Chain Drives" explains construction of Ramsey products, how they operate, what they will do and discusses their lubrication and care.



Now in effect

SPECIAL SUNDAY RATES

for Long Distance telephone calls

AND

REDUCED PERSON-TO-PERSON RATES

after **7** every evening



The Bell System now extends to all day Sunday the same reduced rates which have been in effect on long distance station-to-station calls after 7 p.m. each evening. The reductions apply to most calls on which the day rate for three minutes is more than 35 cents, and range from about 10 per cent on some of the shorter calls to 40 per cent or more on distant calls.

The Bell System also now offers reduced rates on person-to-person calls every night after 7 p.m. and all day Sunday. They apply, in general, on long distance calls on which the day station-to-station rate is more than 35 cents. The discount on most person-to-person calls is the same in money as on station-to-station calls between the same places.

In both social and business affairs, these new Sunday and night rates offer you a broader service at a lower cost. They widen your telephone's usefulness.

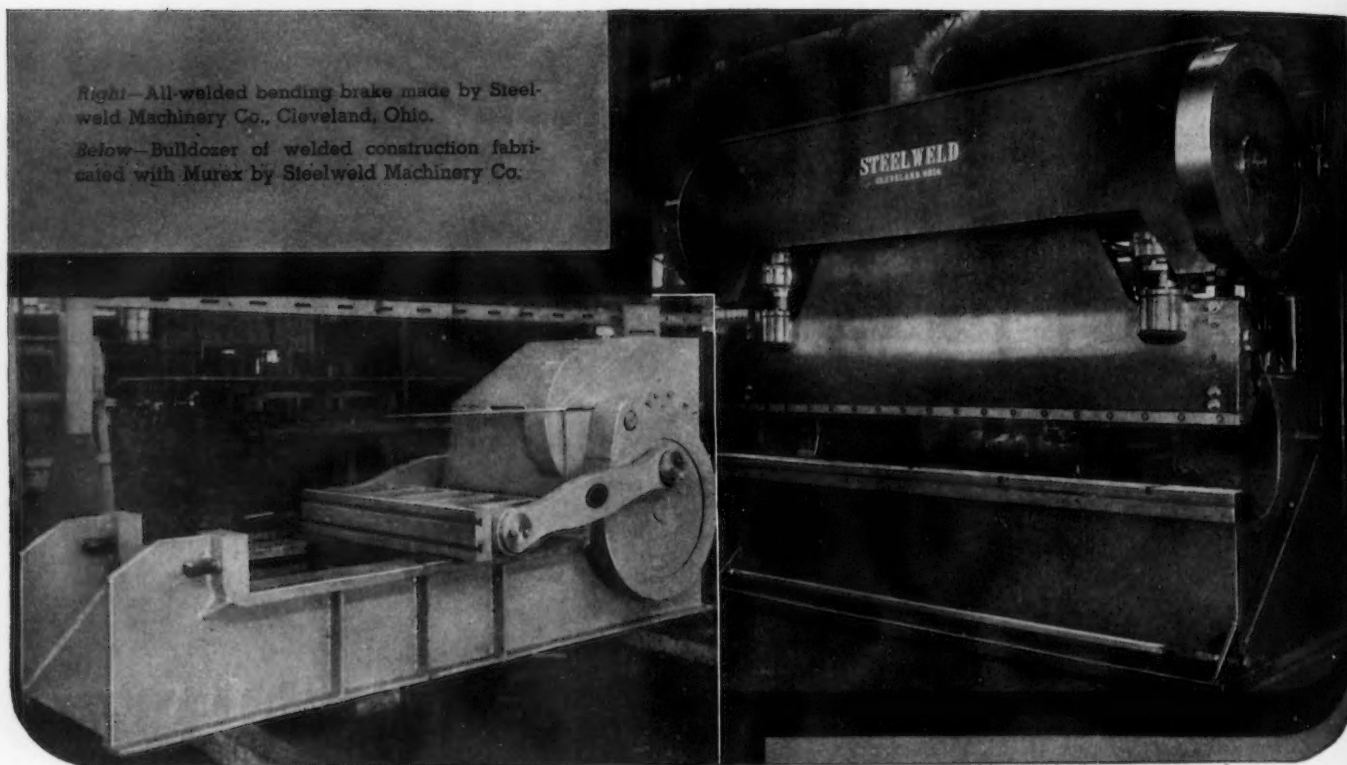
BELL TELEPHONE SYSTEM

TYPICAL THREE-MINUTE RATES

FROM	Station-to-Station			Person-to-Person		
	Day Rate	Sunday and Night Rate	Reduction	Day Rate	Sunday and Night Rate	Reduction
New York to Philadelphia	\$.50	\$.35	\$.15	\$.75	\$.60	\$.15
Pittsburgh to Cleveland	.70	.40	.30	1.00	.70	.30
Chicago to Cincinnati	1.20	.70	.50	1.60	1.10	.50
St. Louis to Chicago	1.25	.75	.50	1.65	1.15	.50
Detroit to Boston	2.55	1.40	1.15	3.25	2.10	1.15
Washington, D.C., to Kansas City	3.50	1.90	1.60	4.50	2.90	1.60
Miami to Boston	4.50	2.50	2.00	5.75	3.75	2.00
Denver to New York	6.00	3.50	2.50	7.50	5.00	2.50
Washington, D.C., to San Francisco	8.50	5.00	3.50	10.75	7.25	3.50

STRONGER, STURDIER

and **BETTER LOOKING**
because of **Murex Welding**



They turned to all-welded construction at the Steelweld Machinery Co. because they wanted to make bending brakes and bulldozers with the strength to resist sudden overloads; the stamina to stand up under continued punishment. The fine, clean lines and handsome appearance of their all-welded machines was an unplanned but natural result of designing with such an objective.

In fabricating these machines, welds of highest quality are essential and all welding is done with Murex Heavy Mineral Coated Electrodes.

Murex Electrodes contribute to ruggedness by assuring consistently sound, dense deposits and weld metal of unequalled physical properties. They add to appearance by providing the smoothest and cleanest of welds.

Just as Steelweld has done, you also can improve your welding with Murex, and, at the same time, economize substantially. For, the Murex coating assures lower welding costs by permitting the use of higher amperages; steps up production by increasing welding speed.

METAL & THERMIT CORPORATION, 120 BROADWAY, NEW YORK, N. Y.
ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

M U R E X

HEAVY MINERAL COATED ELECTRODES

